MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B. Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022

ECONOMICS AND FINANCIAL ACCOUNTING FOR ENGINEERS
(Common to CE, EEE, ECE, CST)

Time: 3Hrs   **Max Marks: 60**

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q. no 1 are compulsory. In Q. no 2 to 6 answer either Part-A or B only

			Marks	CO	BL
Q.1	i.	What do you mean by Law of Demand?	1M	1	2
	ii.	Examine the types of products for demand determination.	1M	1	2
	iii.	Write the Cobb-Douglass production function equation	1M	2	1
	iv	What is BE Point?	1M	2	1
	v.	How do you classify the markets based on competition?	1M	3	2
	vi	Define Oligopoly	1M	3	1
	vii.	Explain the uses of accounting.	1M	4	2
	viii.	Write rules of Debit and Credit.	1M	4	3
	ix.	Define Cost of Goods Sold.	1M	5	1
	x.	What are the different methods used to capital budgeting	1M	5	1

Q.2(A)	Explain nature and significance of managerial economics.	10M	1	2

OR

Q.2(B)	What is elasticity of demand? Explain different methods of price elasticity of demand.	10M	1	3

Q.3(A)	Define cost. Write a note on different cost concepts in economics.	10M	2	4

OR

Q.3(B)	Sales 3,00,000 (Rs.10 per unit) Variable cost @ Rs. 6 per unit Fixed cost Rs.60000 Evaluate 1) BEP in Rs & units 2) P/V Ratio 3) Sales required to earn a profit of Rs. 10000	10M	2	5

Q.4(A)	Define Monopoly. Elucidate features and price output determination under it.	10M	3	2

OR

Q.4(B)	Explain pricing policies and objectives.	10M	3	2

Q.5(A)	Explain advantages and disadvantages of accounting.	10M	4	2

OR

Q.5(B) From the following information of M/s. SANPRE Co. Ltd., you are required to   10M   4   6
prepare Trading A/C, Profit & Loss A/C and Balance Sheet for the year ended
31-3-2021

Particulars	Debit Items	Credit Items
Capital		110000
Cash in Hand	5000	
Cash at bank	20000	
Machinery	50000	
Creditors		30000
Purchases	25000	
Buildings	50000	
bills payable		15000
Purchase returns		1000
Sales		60000
Sales returns	1000	
Rent	2000	
Wages,	6000	
Salary	15000	
Discount	1000	
Office expenses	2500	
Debtors	35000	
Bills receivables	3500	
	216000	216000

Closing Stock – 300000,
Provide Depreciation on Buildings and Machinery 10% respectively.

Q.6(A) How do you classify different types of capital budgeting techniques   10M   5   4

OR

Q.6(B) The Balance Sheet of Punjab Auto Ltd as on 31-12-2010 was as follows: 10M   5   5

Liabilities	Rs	Assets	Rs
Equity Share Capital	80000	Plant and Machinery	40000
Capital reserve	20000	Land and Buildings	40000
Term Loan	40000	Furniture	30000
Creditors	15000	Stock	15000
Bank OD	5000	Debtors	20000
Bills Payables	8000	Short term Investment	10000
		Cash in hand	3000
		Cash at Bank	10000
	168000		168000

From the above information calculate
a) Current Ratio   b) Quick Ratio c) Debt-Equity Ratio   d) Proprietary Ratio
*** END***

Question Paper Code: 20MAT103

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
NUMERICAL METHODS
(Common to CE, EEE & ME)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	Find the second approximation to the root of $x^3 - x - 11 = 0$ in the interval $(2,3)$ by the bisection method.	1M	1	2
	ii.	Define diagonally dominant property	1M	1	1
	iii.	Construct the divided difference table for the data	1M	2	2

x	-1	0	1	3
$y = f(x)$	2	1	0	-1

			Marks	CO	BL
	iv	State Bessel's interpolation formula	1M	2	1
	v.	State the expression for $\left(\dfrac{d^2 y}{dx^2}\right)_{x=x_n}$ using backward differences	1M	3	1
	vi	Find the number of sub intervals when $f(x) = e^{-x}$ with $[0.5, 6.5]$ with $h = 0.5$	1M	3	2
	vii.	State the second order Runge-Kutta method formula.	1M	4	1
	viii.	Find $y(0.1)$ by Euler's method, given that $y' = x - y$ with condition $y(0) = 1$ and $h = 0.1$	1M	4	2
	ix.	Define the normal equations to best fit the parabola $y = a + bx + cx^2$	1M	5	1
	x.	Write the normal equations to fit the curve of the form $y = ab^x$	1M	5	2

		Marks	CO	BL
Q.2(A)	Find a root of $f(x) = 3x + \sin x - e^x$ by Newton-Raphson method correct up to 4 decimal places.	10M	1	3

OR

		Marks	CO	BL
Q.2(B)	Apply Gauss Seidel method to solve the equations $20x + y - 2z = 17$, $3x + 20y - z = -18$ and $2x - 3y + 20z = 25$	10M	1	3

		Marks	CO	BL
Q.3(A)	Estimate the values of $f(42)$ and $f(62)$ from the following data	10M	2	3

x	40	45	50	55	60	65
f(x)	354	332	291	260	231	204

OR

		Marks	CO	BL
Q.3(B)	Find the value of f (10) using Lagrange's Interpolation formula	10M	2	3

x	5	6	9	11
$f(x)$	12	13	14	16

| Q.4(A) | Given that | | | | | | | | 10M | 3 | 3 |

x	1.0	1.1	1.2	1.3	1.4	1.5	1.6
y	7.98	8.40	8.78	9.12	9.45	9.75	10.0

Find $\dfrac{dy}{dx}$ and $\dfrac{d^2y}{dx^2}$ at (a) $x = 1.1$ and (b) $x = 1.6$

OR

| Q.4(B) | Evaluate $\int_0^1 \dfrac{dx}{1+x^2}$ by applying (a) Trapezoidal rule (b) Simpson's 1/3 rule | 10M | 3 | 3 |

(c) Simpson's 3/8 rule

| Q.5(A) | Solve $y' = 3x + y^2, y(0) = 1$ using Taylor's series method, find an | 10M | 4 | 3 |

approximate value of $y(0.1)$ and $y(0.2)$.

OR

| Q.5(B) | Determine $y(1.1)$ and $y(1.2)$ by fourth order Runge-Kutta method, | 10M | 4 | 4 |

given that $\dfrac{dy}{dx} = xy + y^2$ and $y(1) = 1$.

| Q.6(A) | Fit a straight line equation $y = a + bx$ by using Least square method | 10M | 5 | 3 |

x	1	2	3	4	5	6	7	8	9	10
y	52	58	65	70	75	81	87	95	102	108

OR

| Q.6(B) | Fit the curve of the form $y = ae^{bx}$ to the following data | 10M | 5 | 4 |

x	77	100	185	239	285
y	2.4	3.4	7.0	11.1	19.6

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
## FUNDAMENTALS OF ENGINEERING MECHANICS
(Civil Engineering)

Time: 3Hrs   Max Marks: 60

| Attempt all the questions. All parts of the question must be answered in one place only. |
|---|
| **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only** |

			Marks	CO	BL
Q.1	i.	What do you mean by Equilibrium?	1M	1	1
	ii.	Define Moment of a force and write an example.	1M	1	1
	iii.	Differentiate between perfect frame and imperfect frame.	1M	2	4
	iv	What are the different methods of Truss Analysis?	1M	2	1
	v.	Define Limiting friction.	1M	3	1
	vi	Define Cone of friction with neat sketch.	1M	3	1
	vii.	Differentiate between centroid and Centre of Gravity.	1M	4	4
	viii.	Define Radius of Gyration.	1M	4	1
	ix.	State Alembert's Principle.	1M	5	1
	x.	Write Impulse momentum equation,	1M	5	1

| Q.2(A)	Find support reactions for the following	10M	1	4
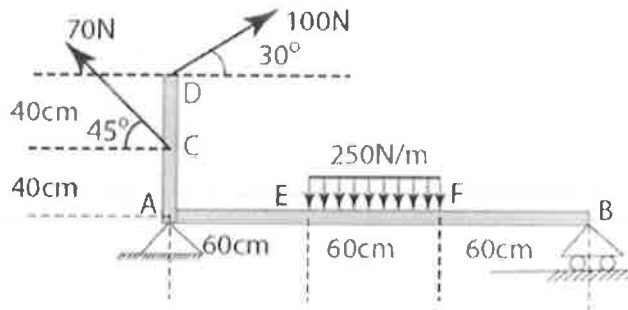
OR

Q.2(B)	Draw Free Body Diagrams for all cylinders. Find the reaction forces at all contact points. Cylinders A and B are resting on a horizontal channel of width 60cm. Diameter of all the cylinders is 40cm. Find contact pressure at surface of contact for the system.	10M	1	4
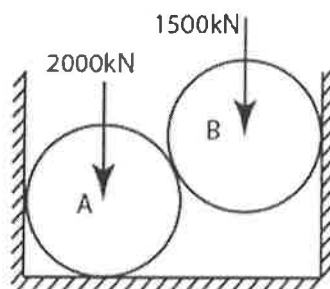
Q.3(A)   Find forces in all members by Joint Method.   10M   2   4
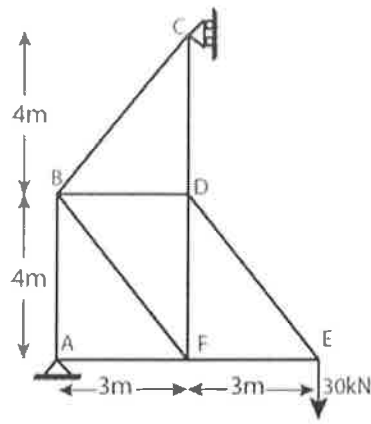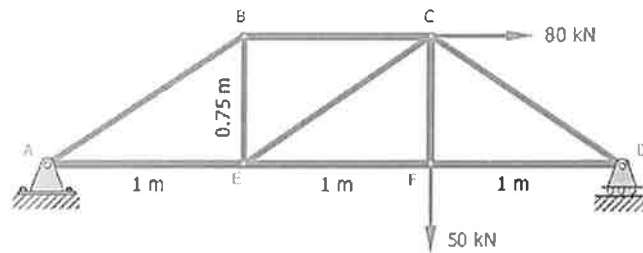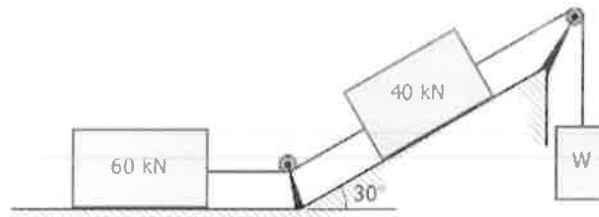

OR

Q.3(B)   From the truss in Fig. below, determine the force in members BC, CE, and   10M   2   4
         EF. Use section method of analysis.

Q.4(A)   What weight W is necessary to start the system of blocks shown in Figure   10M   3   4
         below moving to the right? The coefficient of friction is 0.10 and the
         pulleys are assumed to be frictionless.

OR

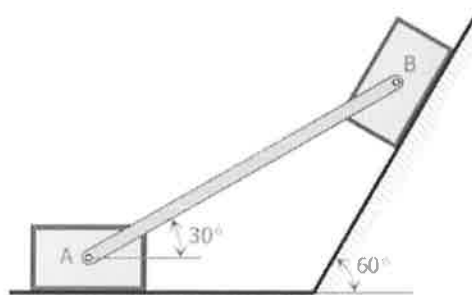Q.4(B)   Referring to Figure below, block A weighs 4 kN and B weighs 3 kN.   10M   3   4
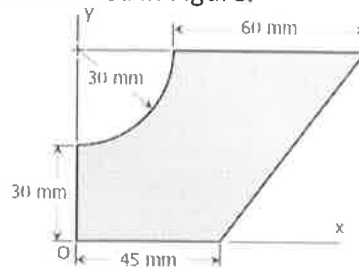   1. If μ = 0.20 under B, compute the minimum coefficient of friction
             under A to   prevent motion.
         2. If μ = 0.30 under both blocks and A weighs 400 lb, find the
             maximum weight of B that can be started up the incline by applying
             to A a rightward force P of 500 lb.

Q.5(A) Locate the centroid of the shaded area in Figure.   10M   4   3

OR

Q.5(B) Determine the moment of inertia of the area shown in figure below with   10M   4   4
respect to its centroidal axes.
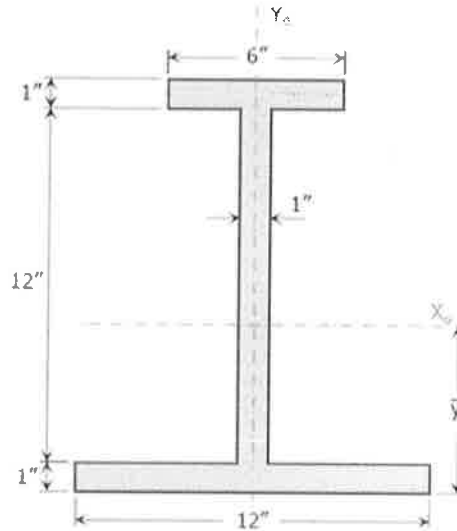
Q.6(A) A projectile is fired up the inclined plane at an initial velocity of 15 m/s. The   10M   5   3
plane is making an angle of 30° from the horizontal. If the projectile was
fired at 30° from the incline, compute the maximum height z measured
perpendicular to the incline that is reached by the projectile. Neglect air
resistance.

*Solve the problem with neat sketch.

OR

Q.6(B) A bullet is fired at an initial velocity of 150 m/s and an angle of 56° at the   10M   5   3
top of a 120 m tall building. Neglecting air resistance, determine the
following:

1.The maximum height above the level ground that can be reached by the
bullet.
2.   The time for the bullet to hit the ground.
3.   The velocity with which the bullet will hit the ground.

*Solve the problem with neat diagram.

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
SURVEYING
(Civil Engineering)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	What is meant by Surveying?	1M	1	1
	ii.	Define Traverse Survey?	1M	1	1
	iii.	State about Level Surface?	1M	2	1
	iv	What are the different types of levelling staff?	1M	2	1
	v.	What is the role of telescope in theodolite?	1M	3	1
	vi	List the essential parts of a Transit?	1M	3	1
	vii.	Define Reverse Curve?	1M	4	1
	viii.	What are the functions of transition curve?	1M	4	1
	ix.	List any Two uses of Total Station?	1M	5	1
	x.	Define EDM?	1M	5	1

Q.2(A) Calculate the area encountered between the surveying line of 48 m length and the shore of a lake. The surveying offset length is shown in the table below. Use any three offset methods.   10M   1   6

Offset	1	2	3	4	5	6	7	8	9
Length	3	4.5	6.4	5.2	4.7	5.1	4	3.2	1.9

OR

Q.2(B) Analyze the advantages and disadvantages of Plane Tabling?   10M   1   4

Q.3(A) Following are the bearings taken in a closed compass traverse   10M   2   5

Lines	F.B.	B.B.
AB	S37°30'E	N37°30'W
BC	S43°15'W	N44°15'E
CD	N73°00'W	S72°15'E
DE	N12°45'E	S13°15'W
EA	N60°00'E	S59°00'W

Compute the interior angle and correct them for observational errors.

OR

Q.3(B) The following staff readings were observed successively with a level, the instrument having been moved after third, sixth, and eighth readings: 2.228; 1.606 ; 0.988 ; 2.090 ; 2.864 ; 1.262 ; 0.602 ; 1.982 ; 1.044 ; 2.684 metres. Enter the above readings in a page of a level book and calculate the R.L. of points if the first reading was taken with a staff held on a benchmark of 432.384 m.   10M   2   5

Q.4(A)	For determining the elevation of the top Q of the tower on a hill. Observation was made from two instrument station P and R, at horizontal distance of 125m apart the station P and R being in line with Q the angle of elevation Q at P and R were 32° 12' and 29° 32' respectively. The staff reading upon the benchmark of 320.32m observation was 4.234m, when the instrument was at P and R the telescope being horizontal. Determine the elevation of the foot of single poles if the signal pole height from it back is 12m.	10M	3	3

OR

Q.4(B)	A theodolite was set upon at a distance of 270m from tower angle of elevation of the top of the top of tower was 12° 39' while the angle of depression to the foot of the tower was 12° 24'. The staff reading on benchmark of RL 2500.41m with telescope horizontal was 2.423m. Find the height of tower was 12° 24'. The staff reading on benchmark of RL 2500.41m with telescope horizontal was 2.423m. Find the height of tower and the RL of the foot of the tower.	10M	3	2

Q.5(A)	Two tangents intersect at chainage 119 metres, the deflection angle being 50°30'. Calculate the necessary data for setting out a curve of 15 chains (1 chain = 20metres) radius to connect the two tangents if it is intended to set out the curve by offset from chords. Take peg interval equals to 100 links, length of the chain being equal to 20 metres (100 links).	10M	4	5

OR

Q.5(B)	Discuss the methods of setting out simple curves, in detail?	10M	4	6

Q.6(A)	Illustrate about the different segments of GPS?	10M	5	2

OR

Q.6(B)	Briefly explain about the different parts of total station with neat sketch.	10M	5	6

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
MECHANICS OF FLUIDS
(Civil Engineering)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	What is Newton's law of Viscosity?	1M	1	1
	ii.	State Archimedes principle.	1M	1	1
	iii.	Define Streak line and path line.	1M	2	1
	iv	State Bernoulli's theorem.	1M	2	1
	v.	What do you mean by syphon?	1M	3	1
	vi	Differentiate between Laminar flow and Turbulent flow	1M	3	1
	vii.	Define the term most economical section of a channel.	1M	4	1
	viii.	Define Specific energy.	1M	4	1
	ix.	What do you mean by Mild slope?	1M	5	1
	x.	Define Froude's number.	1M	5	1

Q.2(A)	i. What do you mean by Viscosity? What is Newton's law of Viscosity? How fluids are Classified based on Newton's law of Viscosity.	5M	1	4
	ii. Determine the viscosity of a liquid having kinematic viscosity 6 stokes and specific gravity 1.9	5M	1	4

Q.2(B)	i. Define Total Pressure and Centre of pressure?	5M	1	3
	ii. Define Stable equilibrium, Unstable Equilibrium and Neutral Equilibrium? What are the conditions of equilibrium of a submerged body?	5M	1	3

Q.3(A)	i. Describe the classification of fluid motion	5M	2	2
	ii. Differentiate between the following	5M	2	2
	(a) Uniform flow and Non uniform flow			
	(b) Steady flow and unsteady flow			

OR

Q.3(B)	i. What is an Orifice meter? Derive an expression for discharge through an Orifice meter.	5M	2	4
	ii. A horizontal Venturimeter with inlet and throat diameters 30cm and 15cm is used to measure the flow of water. The reading of differential manometer connected to inlet and throat is 10cm of mercury. Determine the rate of flow. Take Coefficient of discharge. Cd=0.98	5M	2	4

Q.4(A)	i. Differentiate between characteristics of laminar flow and turbulent flow ii.	5M	3	4
	The Reynolds number for flow of oil through a 50mm diameter pipe is 1700.If kinematic viscosity =0.0744 stokes, what is the velocity at a point 6.25mm from the wall.	5M	3	4

Q.4(B)	i. Explain the following (a)Hydraulic Gradient Line (b) Total Energy Line	5M	3	3

	ii. A compound pipe systems consists of 1800m of 50cm,1200m of 40cm,600m of 30cm pipes of some material connected in series
	    (a) What is the equivalent size of a pipe
	    (b) What is the equivalent length of 40cm diameter pipe
		5M	3	3

Q.5(A)	i. Describe the classification of open channel flow	5M	4	2
	ii. Find the velocity of flow and rate of flow of water through a rectangular channel of 6m wide and 3m deep, when it is running full. The channel is having bed slope as 1 in 2000.Take cheyzy's constant C=55	5M	4	2
	OR			
Q.5(B)	i. Explain the terms: Specific energy, Critical flow, Sub critical flow and super critical flow	5M	4	3
	ii. The discharge of water through a rectangular channel of width 8m, is $15m^3$/sec when depth of flow of water is 1.2m. Calculate (a) Specific energy of flowing water (b) Critical depth and critical velocity (c) Value of minimum specific energy	5M	4	3
Q.6(A)	(i). What is the essential difference between gradually varied flow and rapidly varied flow? Illustrate with neatly drawn sketch	5M	5	4
	(ii). The depth of flow of water is 0.3m at a certain section of a rectangular channel of 2m wide. The discharge through the channel is 1.5 m^3/sec. Determine whether a hydraulic jump will occur, and if so, find its height and loss of energy per kg of water.	5M	5	4
	OR			

Q.6(B)	Distinguish between
	    (a) Geometric similarity and Kinematic similarity
	    (b) Model and Prototype
	    (c) Distorted model and Undistorted model
		10M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
ELECTRICAL CIRCUIT ANALYSIS
(EEE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	State Norton's theorem	1M	1	1
	ii.	From a linear network with DC Voltage source, the maximum power transferred to a load is 100 W. When the load is shorted, 2A DC current flows. Find open circuit voltage.	1M	1	2
	iii.	What is the phase angle of a series RLC circuit when $X_L=X_C$	1M	2	1
	iv	What is the average power delivered to an impedance $(4+j3)\Omega$ by a current $5\cos(314t+60^0)$	1M	2	2
	v.	Define time constant? Write its formula for series R-L circuit with DC excitation	1M	3	1
	vi	Write the current expression in series R-C circuit (initially relaxed) with DC excitation.	1M	3	1
	vii.	Why z-parameters are called as open circuit impedance parameters?	1M	4	1
	viii.	Define two port network	1M	4	2
	ix.	Find the Laplace transform of unit ramp function?	1M	5	1
	x.	The inverse Laplace transform of $1/(s^2+s)$ is..............?	1M	5	2

		Marks	CO	BL
Q.2(A)	Find the Thevenin equivalent circuit (between a and b) for the network shown in Fig. 1.	10M	1	3
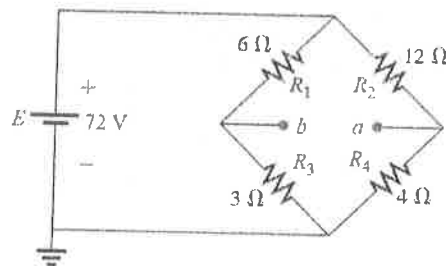
Fig. 1

OR

Q.2(B) Use mesh analysis to find currents i1, i2 and i3 for following Fig. 2   10M   1   3
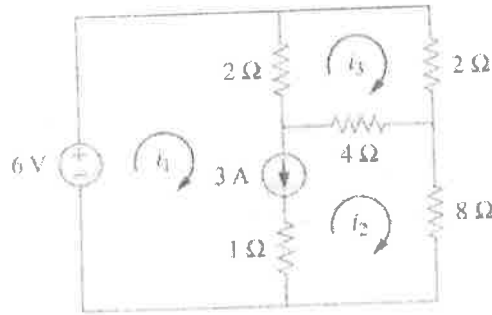
Fig. 2

Q.3(A) i) A pure inductance of 318.3 mH is connected in series with a 200 Ω   5M   2   3
resistor to a 240 V, 50 Hz AC supply. Calculate (a) the inductive
reactance of the coil, (b) the impedance of the circuit, (c) the current in
the circuit, (d) the p.d. across each component.

ii) A sinusoidal voltage of V = 50sinωt is applied to a series RL circuit. The   5M   2   3
current in the circuit is given by I = 25sin(ωt-53⁰). Determine real power,
reactive power and power factor.

OR

Q.3(B) The unbalanced -load shown in Fig.3 is supplied by balanced line-to-line   10M   2   3
voltages of 240 V in the ABC phase sequence. Find the line currents.
Take Vab as reference
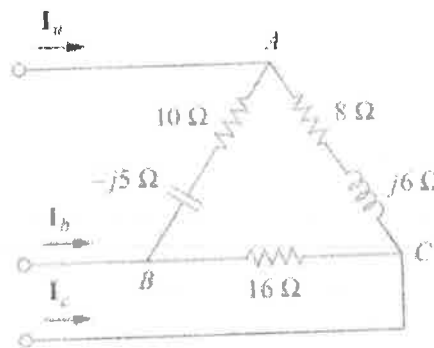
Fig. 3

Q.4(A) Using classical method of solution of differential equations, find the   10M   3   3
value of $Vc(t)$ for t>0 in the circuit shown Fig.4. Assume initial condition
$Vc(0^-) = 9$ V.
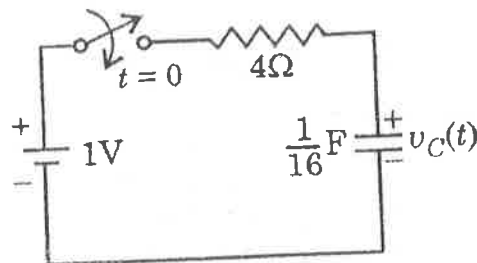
Fig. 4

OR

Q.4(B) Derive the expression for transient current for a RL & RC series circuit   10M   3   2
with DC voltage source.

Page **2** of **3**

Q.5(A) Find Transmission parameters for the two-port network shown in Fig.5   10M   4   3
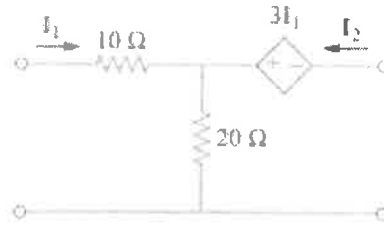
Fig. 5

OR

Q.5(B) Derive ABCD parameters in terms of Z-parameters and Y-parameters.   10M   4   2

Q.6(A) Derive the Laplace transform of some common forcing functions with   10M   5   3
neat sketch.

OR

Q.6(B) For the series RLC Circuit shown in Fig. 6 with the capacitor initially   10M   5   3
charged to voltage of 1 V as indicated. Find the expression for i(t) using
Laplace Domain Approach. Also draw the s-domain representation of
the circuit
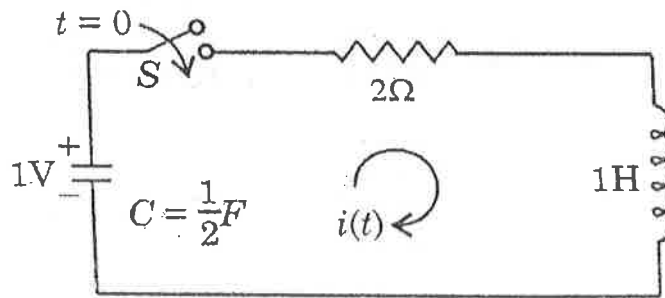
Fig. 6

*** END ***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20)Regular End Semester Examinations –MARCH 2022
DC MACHINES & TRANSFORMERS
(EEE)

Time: 3Hrs   **Max Marks: 60**

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

			Marks	CO	BL
Q.1	i.	What is linear magnetic circuit?	1M	1	1
	ii.	Write the expression of Force in term of partial derivative of stored energy with respect to position of a moving element.	1M	1	1
	iii.	What are the main parts of DC Generator?	1M	2	1
	iv	Differentiate Lap and wave winding of a Dc machine	1M	2	1
	v.	What is the significance of back e.m.f?	1M	3	1
	vi	What is the necessity of 3-point starter?	1M	3	1
	vii.	What is meant by transformation ratio of a transformer	1M	4	1
	viii.	List out different applications of auto-transformer.	1M	4	1
	ix.	What are the advantages of star-connection over delta connection?	1M	5	1
	x.	What are the types of tap changing transformer?	1M	5	1

		Marks	CO	BL
Q.2(A)	Derive the expression for energy in a magnetic system with net sketch.	10M	1	4
	OR			
Q.2(B)	An iron ring of mean length 50 cm has an air gap of 1 mm and winging of 200 turns. If the relative permeability of iron is 400, when a current of 1 A flows in the winding. Determine the flux density neglecting leakage and fringing.	10M	1	3

		Marks	CO	BL
Q.3(A)	Distinguish between self-excited and separately excited DC generators. How self-excited generators are classified? Explain with circuit diagrams	10M	2	4
	OR			
Q.3(B)	Derive the expressions for calculating the demagnetizing and cross magnetizing ampere turns per pole in a Dc generator.	10M	2	4

		Marks	CO	BL
Q.4(A)	(i) Derive the torque equation of a DC Motor?	5M	3	4
	(ii) A 220V, 4-pole, wave connected dc series motor has armature and field resistances of 0.15Ω and 0.85Ω respectively. The armature of motor has 60 conductors per pole. The flux developed in the air gap is 20mWb. Find the speed of the motor.	5M	3	2
	OR			
Q.4(B)	(i) Explain the internal and external characteristics of DC series motor	5M	3	2
	(ii) A 220V D.C shunt motor is running at 1500r.p.m and it takes a line current of 25A.The output is 20HP. The load torque varies as a square of speed. Calculate the resistance to be connected in series with armature for reducing the motor speed to 1200r.p.m	5M	3	3

Q.5(A) A 20 kVA, 250V/2500V, 50 Hz, 1-ph transformer gave the following test   10M   4   4
result;
      SC Test: 120 V, 8 A, 320 W
      OC Tect: 250 V, 1.4 A, 105 W
Find the circuit parameters and draw the equivalent circuit of the
transformer referred to LV winding.

OR

Q.5(B) (i) Draw the exact and approximate equivalent circuit of 1-phase   5M   4   2
transformer and explain.

(ii) In a 25KVA 2000/200 V transformer the iron and copper losses are 300   5M   4   3
and 400W. Calculate efficiency on UPF at half load

Q.6(A) Explain and draw the following vector group   10M   5   2
    a) D_Y11 b) D_z6 c) D_d0 d) Y_z1

OR

Q.6(B) A bank of three single phase transformers has its h.v terminals connected to   10M   5   3
3 wire, 3 phase, 11KV system. Its l.v terminals are connected to a 3 wire 3
phase load at 1500KVA, 2200V. Specify the voltage, current and KVA ratings
of each transformer for both h.v and l.v windings for the following
connection: (i) Y-Y (ii) , Δ-Y

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
ANALOG ELECTRONICS
(EEE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	Write the PN Diode Current Equation.	1M	1	1
	ii.	Define stability factor for Bipolar Junction transistor?	1M	1	1
	iii.	Write the relationship between drain current and Gate to source voltage in JFET.	1M	2	1
	iv	What are the DC characteristics of ideal Operational Amplifier	1M	2	1
	v.	Define VCO.	1M	3	1
	vi	What are the applications of non-inverting amplifiers?	1M	3	1
	vii.	What is active filter?	1M	4	1
	viii.	What are the Barkhausen condition for oscillator?	1M	4	1
	ix.	How many resisters are required in a 12-bit weighted resister DAC?	1M	5	1
	x.	Define resolution of ADC. Give its formula	1M	5	1

Q.2(A)	(i) How Zener diode acts as voltage regulator under reverse bias condition?	5M	1	2
	(ii) Explain the output characteristics of CE- BJT.	5M	1	2

OR

Q.2(B)	(i) Explain the Fixed bias circuit for BJT and hence derive the stability factor	5M	1	2
	(ii) Compute the Q point and hence find the value of stability factor for the voltage divider bias shown in figure	5M	1	2
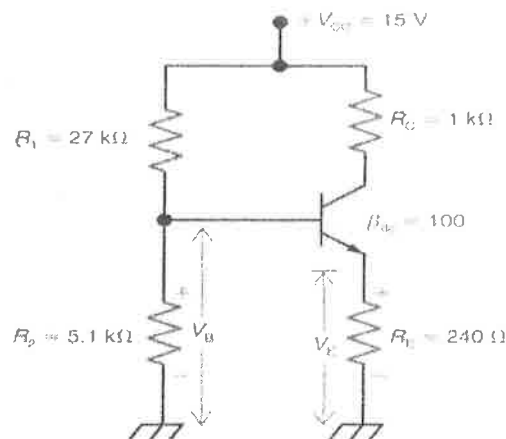
Q.3(A)	(i) Explain the small signal model for Junction Field effect Transistor and hence draw its high frequency model	5M	2	2
	(ii) Explain Junction Field Effect Transistor parameters and hence write the relationship between drain current and Gate to Source voltage	5M	2	2

OR

Q.3(B)	i) Explain the operation of enhancement MOSFET and hence draw its drain and transfer characteristics	5M	2	2
	ii) Explain the following characteristics of Operational amplifier 1. CMRR 2. Bandwidth 3. Slew rate 4. Gain bandwidth Product 5. Input and output resistance	5M	2	2

Q.4(A)	Explain about Differentiator and Integrator using operational amplifier and derive its transfer function.	10M	3	2

OR

Q.4(B)	Explain the instrumentation amplifier and derive the expression for its output voltage and list the applications.	10M	3	2

Q.5(A)	(i) Draw the circuit of first order HPF and derive its transfer function?	5M	4	2
	(ii) explain the operation of Wein Bridge oscillator.	5M	4	2

OR

Q.5(B)	(i) Design an astable multivibrator using 555 Timer IC.	5M	4	2
	(ii) Draw the circuit of first order LPF and derive its transfer function?	5M	4	2

Q.6(A)	(i)Discuss R-2R DAC in detail. Draw its transfer characteristics	5M	5	2
	(ii)Explain about pressure sensor (MPX2010)	5M	5	2

OR

Q.6(B)	Explain successive Approximation ADC with block diagram.	10M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
BASIC THERMODYNAMICS
(Mechanical Engineering)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	Distinguish between the terms change in state, process, path and cycle.	1M	1	2
	ii.	What is a quasi-static process?	1M	1	1
	iii.	What is a saturation state for a pure substance?	1M	2	1
	iv	What is normal boiling point?	1M	2	1
	v.	What is the difference between a reversible process and an irreversible process?	1M	3	1
	vi	Describe the four processes which constitute the Carnot cycle?	1M	3	2
	vii.	Draw the T-s diagram of Otto cycle.	1M	4	1
	viii.	What is compressibility factor?	1M	4	1
	ix.	Define compression ratio of a reciprocating engine.	1M	5	1
	x.	Define the term mean effective pressure.	1M	5	1

| Q.2(A) | Air enters an adiabatic nozzle steadily at 300 kPa, 200°C, and 30 m/s and leaves at 100 kPa and 180 m/s. The inlet area of the nozzle is 80 cm2. Determine (i) the mass flow rate through the nozzle, (ii) the exit temperature of the air, and (iii) the exit area of the nozzle. | 10M | 1 | 3 |

OR

| Q.2(B) | Explain in detail the concepts of
a) Internal Energy   b) Flow Work   c) Enthalpy. | 10M | 1 | 2 |

| Q.3(A) | Briefly explain the phase change process of water at atmospheric pressure with property diagram. | 10M | 2 | 3 |

OR

| Q.3(B) | Steam initially at 1.5 MPa, 300°C expands reversibly and adiabatically in a steam turbine to 40°C. Determine the ideal work output of the turbine per kg of steam. | 10M | 2 | 3 |

| Q.4(A) | A heat pump is used to meet the heating requirements of a house and maintain it at 20°C. On a day when the outdoor air temperature drops to -2°C, the house is estimated to lose heat at a rate of 80,000 kJ/h. If the heat pump under these conditions has a COP of 2.5, determine (i) the power consumed by the heat pump and (ii) the rate at which heat is absorbed from the cold outdoor air. | 10M | 3 | 3 |

OR

Q.4(B)	A Carnot heat engine receives 500 kJ of heat per cycle from a high-temperature source at 652°C and rejects heat to a low-temperature sink at 30°C. Determine (i) the thermal efficiency of this Carnot engine and (ii) the amount of heat rejected to the sink per cycle.	10M	3	3

Q.5(A)	Describe Joule Thomson experiment with the help of T-p diagram.	10M	4	3
	OR			
Q.5(B)	A constant volume chamber of 0.3 m3 capacity contains 2 kg of this gas at 5°C. Heat is transferred to the gas until the temperature is 100°C. Find the work done, the heat transferred, and the changes in internal energy, enthalpy and entropy.	10M	4	3

Q.6(A)	A Brayton cycle has inlet at 290 K, 90 kPa and the combustion adds 1000 kJ/kg. How high can the compression ratio be so the highest temperature is below 1700 K? Use cold air properties to solve.	10M	5	3
	OR			
Q.6(B)	Derive an expression for the air standard thermal efficiency of an Otto Cycle with suitable assumptions.	10M	5	3

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
FLUID MECHANICS & HYDRAULIC MACHINERY
(Mechanical Engineering)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only. **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

			Marks	CO	BL
Q.1	i.	Define following properties of fluids (a) Specific weight and (b) Viscosity	1M	1	1
	ii.	What is a Newtonian fluid?	1M	1	1
	iii.	State the assumption made to derive the Bernoulli equations	1M	2	1
	iv	What are the different types of fluid?	1M	2	1
	v.	Define Displacement thickness	1M	3	1
	vi	What are minor losses in pipe flow?	1M	3	1
	vii.	Define Degree of Reaction	1M	4	1
	viii.	Classify turbines based according to Head available at inlet.	1M	4	1
	ix.	Define specific speed for centrifugal pump?	1M	5	1
	x.	What are the differences between single acting and double acting pump?	1M	5	1

Q.2(A)	A Wooden block of specific gravity 0.7 and having size of 2 m x 0.5 m x 0.25 m is floating in water. Determine the volume of concrete of specific weight 25 kN/m³, that may be placed which will immerse (i) the block completely in water, and (ii) the block and concrete completely in water.	10M	1	3

<div align="center">OR</div>

Q.2(B)	i. Explain different types of Fluid.	5M	1	4
	ii. The dynamic viscosity of oil, used for lubrication between a shaft and sleeve is 6 poise. The shaft is of diameter 0.4 m and rotates at 190 r.p.m. Calculate the power lost in the bearing for a sleeve length of 90 mm. The thickness of the oil film is 1.5 mm.	5M	1	3

Q.3(A)	A 45⁰ reducing bend is connected in a pipe line, the diameter at inlet and outlet of the bend being 600 mm and 300 mm respectively. Find the force exerted by the water on the bend if the intensity of the pressure at inlet to the bend is 8.829 N/cm² and rate of the flow of water is 600 lt/s.	10M	2	3

<div align="center">OR</div>

Q.3(B)	Derive Bernoulli equation from Euler's equation.	10M	2	4

Q.4(A)	Explain and derive the equation for displacement thickness, Momentum thickness and Energy Thickness.	10M	3 3

OR

Q.4(B)	For the velocity profile for laminar boundary layer	10M	3 5

$$\frac{u}{U} = \frac{3}{2}\left(\frac{y}{\delta}\right) - \frac{1}{2}\left(\frac{y}{\delta}\right)^3.$$

Determine the boundary layer thickness, shear stress, drag force and co-efficient of drag in terms of Reynolds number.

Q.5(A)	Explain the impulse momentum principle. Show that the efficiency of jet striking normally on series of flat plate mounted on the periphery of the wheel is 50%.	10M	4 3

OR

Q.5(B)	An inward flow reaction turbine has external and internal diameters as 1 m and 0.6 m respectively. The hydraulic efficiency of the turbine is 90% when the head on the turbine is 36 m. The velocity of flow at outlet is 2.5 m/s and discharge at outlet is radial. If the vane angle at outlet is 15° and width of the wheel is 100 mm at inlet and outlet. Determine: (i) the guide blade angle, (ii) speed of the turbine, (iii) vane angle of the runner at inlet,(iv) volume flow rate of turbine and (v) power developed.	10M	4 4

Q.6(A)	With a neat sketch, explain the principle and working of a centrifugal pump.	10M	5 2

OR

Q.6(B)	A single-acting reciprocating pump, running at 50 rpm, delivers 0.01 m³/s of water. The diameter of the piston is 200 mm and stroke length 400 mm. Determine: (i) The theoretical discharge of the pump, (ii) Co-efficient of discharge, and (iii) Slip and the percentage slip of the pump.	10M	5 3

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
ENGINEERING MECHANICS
(Mechanical Engineering)

Time: 3Hrs   Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

			Marks	CO	BL
Q.1	i.	State parallelogram law of forces.	1M	1	1
	ii.	Define FBD and state its importance in the analysis of problems.	1M	1	1
	iii.	What are trusses?	1M	2	1
	iv	Why is the coefficient of static friction greater than the coefficient of kinetic friction?	1M	2	1
	v.	Define centroid.	1M	3	1
	vi	State the Perpendicular axis theorem.	1M	3	1
	vii.	Define Kinematics.	1M	4	1
	viii.	Distinguish between Rectilinear motion and curvilinear motion.	1M	4	1
	ix.	What is conservation of momentum?	1M	5	1
	x.	Define the term Impulse.	1M	5	1

Q.2(A)	Forces P1, P2, P3 and P4 of magnitude 10kN,20kN,25kN and 40kN are concurrent in space and are oriented at 30^0, 135^0, 230^0, and 315^0respectively. Determine the resultant of the system of forces.	10M	1	3

OR

Q.2(B)	Determine resultant of the force system shown in the figure	10M	1	3
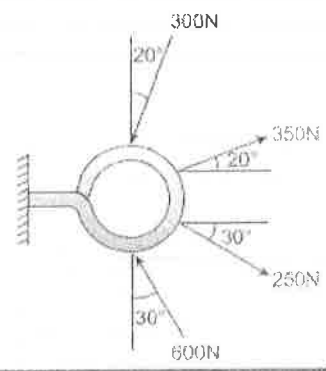
Q.3(A)	Calculate the support reactions for the beam as shown in the figure	10M	2	3

OR
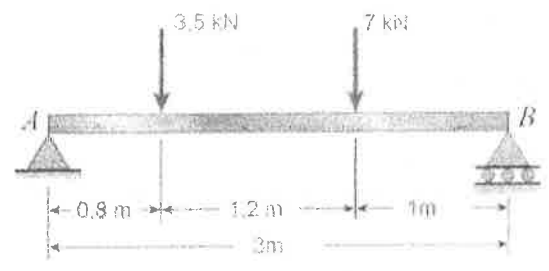
Q.3(B)　A uniform ladder of weight 800N and of length 7 m rests on a horizontal　10M　2　3
ground and leans against a smooth vertical wall. The angle made by the
ladder with the horizontal is 60^0. When a man of weight 600N stands on
the ladder at a distance 4m from the top of the ladder (along its length),
the ladder is at the point of sliding. Determine the coefficient of friction
between the ladder and the floor.

Q.4(A)　Find the centroid of the Z section shown in Figure　10M　3　3
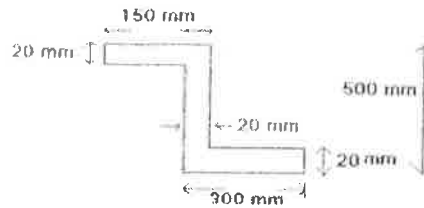
OR

Q.4(B)　Find the moment of inertia about the centroidal axes XX and YY of the　10M　3
section shown in Fig.
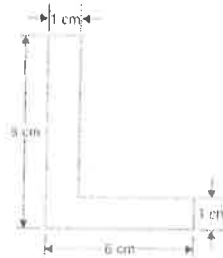
Q.5(A)　The weight of a body on earth is 980 N. If the acceleration due to gravity on　10M　4　3
earth is 9.80 m/s², what will be the weight of the body on i) The moon,
where gravitational acceleration is 1.6 m/s² and ii) The sun, where
gravitational acceleration is 270 m/s²

OR

Q.5(B)　A player kicks the football with a velocity of 24 m/sec at an angle of 36　10M　4　3
degree from the ground.
Determine for this projectile:
(i) total time of flight
(ii) maximum height attained by football
(iii) velocity of football after 1.2 sec and 2 sec
(iv) range of football
(v) maximum range of football it could attain

Q.6(A)　A block of weight 2000 N rests on a level horizontal plane for which　10M　5　3
coefficient friction is 0.2. The block is pulled by a force of 1000 N acting at
an angle of 30° to the horizontal. Find the velocity of the block after
travelling a distance of 50 m from the rest. If the force of 1000 N is removed,
how far will it move before coming to stop.

OR

Q.6(B)　The rotation of a flywheel is governed by the equation ω= 3t²-2t+2 where　10M　5　3
ω is radian per second and time is in second. After one second from the
rest, the angular displacement was 4 radians. Determine the angular
displacement, angular velocity and acceleration of the flywheel after
travelling 3 seconds.

*** END ***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B. Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
MATERIAL SCIENCE & ENGINEERING
(Mechanical Engineering)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q. no 1 are compulsory. In Q. no 2 to 6 answer either Part-A or B only

			Marks	CO	BL
Q.1	i.	Define space lattice.	1M	1	1
	ii.	Classify materials.	1M	1	1
	iii.	What is a twin boundary?	1M	2	1
	iv	List down all the strengthening mechanisms in metals.	1M	2	1
	v.	What is Young's modulus?	1M	3	1
	vi	What is normalizing?	1M	3	1
	vii.	What is the maximum carbon solubility in Ferus?	1M	4	1
	viii.	Write down Eutectic reaction.	1M	4	1
	ix.	What is the percentage of carbon in low-carbon steels?	1M	5	1
	x.	What is Polymer matrix composite?	1M	5	1
Q.2(A)		Explain briefly on the importance, classification of materials and its applications	10M	1	3
		OR			
Q.2(B)		Explain any two types of Primary bonding in solids.	10M	1	3
Q.3(A)		Explain in brief about dislocations and their types.	10M	2	3
		OR			
Q.3(B)		Describe in your own words the three strengthening mechanisms by explaining how dislocation happens in each case.	10M	2	5
Q.4(A)		Describe in your own words the difference between Toughness and Resilience, malleability and rigidity.	10M	3	5
		OR			
Q.4(B)		With the neat sketch explain mar-tempering.	10M	3	3
Q.5(A)		With neat sketch draw FeFe3C diagram and list out the reactions in it.	10M	4	3
		OR			
Q.5(B)		Explain CCT Curve with a neat sketch.	10M	4	3
Q.6(A)		What is the effect of additional alloying elements like Si, Mn in steels?	10M	5	3
		OR			
Q.6(B)		Explain the classification of composite materials with examples.	10M	5	4

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations –MARCH 2022
TRANSFORMS & PARTIAL DIFFERENTIAL EQUATIONS
(ECE)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	Find the Laplace transform $x^6 Sin^2 3x + x^6 Cos^2 3x$?	1M	1	2
	ii.	Define the integral equation?	1M	1	1
	iii.	State the shifting property on Fourier transforms?	1M	2	1
	iv	State the Modulation theorem on Fourier transforms?	1M	2	1
	v.	Find Z- transform of $n^2 a^n$?	1M	3	1
	vi	Find the Z-transform of unit step function	1M	3	1
	vii.	Form the PDE by eliminating arbitrary function f from $z = f(x^2 - y^2)$	1M	4	2
	viii.	Solve $p - q = 1$	1M	4	1
	ix.	Write the form of one-dimensional heat equation?	1M	5	1
	x.	Write the solution form of the one-dimensional wave equation?	1M	5	1

Q.2(A)	(i) Evaluate $\int\limits_0^\infty \dfrac{e^{-ax} \sin bx}{x} dx$	5M	1	3
	(ii) Find $L^{-1}\left(\dfrac{1}{p^2(p^2+1)}\right)$	5M	1	3

OR

Q.2(B)	(i) Solve the following Integral equation $3\sin 2x = y(x) + \int\limits_0^x (x-t)y(t)dt$	5M	1	3
	(ii) Find convolutions of the pairs of the functions t, e^{at}	5M	1	3

Q.3(A)	Prove that	10M	2	4
	(a) $F\{x^n f(x)\} = (-i)^n \dfrac{d^n}{ds^n}[F(s)]$ (b) $F\left\{\dfrac{d^n}{dx^n} f(x)\right\} = (-is)^n F(s)$			

OR

Q.3(B)	Solve the integral equation $\int_0^\infty f(\theta) \cos \alpha\theta d\theta = \begin{bmatrix} 1-\alpha, & 0\le\alpha\le1 \\ 0, & \alpha>1 \end{bmatrix}$ Hence evaluate $\int_0^\infty \dfrac{sin^2 t}{t} dt$.	10M	2	4

Q.4(A) Use Convolution theorem evaluate the inverse Z-transforms of the following: 10M   3   3

(a) $\dfrac{z^2}{(z+a)(z+b)}$ (b) $\dfrac{1}{n!} * \dfrac{1}{n!} = \dfrac{2^n}{n!}$

OR

Q.4(B) Using Z-transform solve $u_{n+2} + 4u_{n+1} + 3u_n = 3^n$ with $u_0 = 0$, $u_1 = 1$ 10M   3   3

Q.5(A) (i) Form the PDE by eliminating the arbitrary constants from   5M   4   3

(a) $(x-a)^2 + (y-b)^2 + z^2 = c^2$ (b) $\dfrac{x^2}{a^2} + \dfrac{y^2}{b^2} + \dfrac{z^2}{c^2} = 1$

(ii) Form the PDE by eliminating the arbitrary functions from   5M   4   3
$lx + my + nz = \phi(x^2 + y^2 + z^2)$

OR

Q.5(B) Solve the following Lagrange's linear equations: 10M   4   4
(a) $x^2(y-z)p + y^2(z-x)q = z^2(x-y)$
(b) $(mz - ny)\dfrac{\partial z}{\partial x} + (nx - lz)\dfrac{\partial z}{\partial y} = ly - mx$

Q.6(A) Using the method of separation of variable, solve $4\dfrac{\partial u}{\partial x} + \dfrac{\partial u}{\partial y} = 3u$, where   10M   5   3

$u(0, y) = 3e^{-y} - e^{-5y}$

OR

Q.6(B) Find the eigenvalues λ_n and eigenfunctions $y_n(x)$ for the equation   10M   5   3
$y'' + \lambda y = 0$ in each of the following cases:

(a) $y(0) = 0$, $y(\dfrac{\pi}{2}) = 0$

(b) $y(0) = 0$, $y(L) = 0$ when $L > 0$
(c) $y(-L) = 0$, $y(L) = 0$ when $L > 0$
(d) $y(a) = 0$, $y(b) = 0$ when $a < b$

*** END ***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
ELECTRONIC DEVICES & CIRCUITS
(ECE)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

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Q.No		Question	Marks	CO	BL
Q.1	i.	What is intrinsic semiconductor?	1M	1	1
	ii.	Explain the term doping.	1M	1	2
	iii.	What is meant by depletion region?	1M	2	1
	Iv	Write the applications of photo diode.	1M	2	2
	v.	What is Early effect?	1M	3	1
	Vi	Why FET is called voltage controlled device?	1M	3	4
	vii.	Define peak inverse voltage.	1M	4	1
	viii.	What is voltage regulator?	1M	4	1
	ix.	What is meant by small signal amplifier?	1M	5	4
	x.	Draw depletion MOSFET symbols and name the terminals.	1M	5	2
Q.2(A)		Define Hall effect? and also explain the experimental determination of mobility.	10M	1	4
		OR			
Q.2(B)		Develop the expressions for mobility, conductivity for both intrinsic and extrinsic semiconductors.	10M	1	3
Q.3(A)		Explain about current components in a p-n diode. Also draw the V-I characteristics of p-n junction diode.	10M	2	4
		OR			
Q.3(B)		From the energy band diagram explain the VI characteristic of a tunnel diode.	10M	2	4
Q.4(A)		Explain input and output characteristics of the transistor in CE configuration with a neat sketches.	10M	3	4
		OR			
Q.4(B)		Draw the basic structure of N- channel JFET and explain the operation with the help of characteristic curves.	10M	3	2
Q.5(A)		Explain the operation of full wave centre-tap rectifier with capacitor filter. Derive the expression for ripple factor for the above circuit.	10M	4	2
		OR			
Q.5(B)		Explain the following: (i) How zener diode acts as voltage regulator. (ii) Positive clamper and negative clamper circuits without biasing.	10M	4	4
Q.6(A)		In a typical single stage CE amplifier, R_s=1 kΩ, R_L=1.2 kΩ using h_{fe}=50, h_{oe} = 25×10^{-6} A/V, h_{re} = 2.5×10^{-4} , hie = 1100Ω. Find A_I , A_V , Z_I and Z_o.	10M	5	3
		OR			
Q.6(B)		Discuss the following: i. Small signal model of MOSFET. ii. MOSFET as voltage control device.	10M	5	4

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
NETWORK THEORY
(ECE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	Define Thevenin's theorem	1M	1	1
	ii.	Define tree and co tree	1M	1	1
	iii.	What is resonance?	1M	2	3
	iv	Draw resonance characteristics for series RLC circuits.	1M	2	1
	v.	Find Laplace transform of $e^{-3t}\cos(8t)$.	1M	3	2
	vi	What is final value theorem?	1M	3	2
	vii.	Write expressions for short circuit impedance parameters	1M	4	1
	viii.	Write the symmetry conditions for h-parameters.	1M	4	1
	ix.	Define Decibel.	1M	5	1
	x.	Define driving point impedance.	1M	5	2
Q.2(A)	i) State and Explain Maximum power transfer Theorem.		6M	1	2
	ii) Write the applications of Millimans and Telligens Theorems.		4M	1	2

OR

Q.2(B)	Write the tie set and cutest matrix for the graph given below. Select 2,4 and 5 as tree branches.	10M	1	3

Q.3(A)	Prove that the resonance frequency is the product of square root of two half power frequencies.	10M	2	2

OR

Q.3(B)	i) Describe the characteristics curves of Parallel resonance circuits.	4M	2	3
	ii) A coil having an inductance of 50 mH and resistance 10 Ω is connected in series with a 25 μF capacitor across a 200 V ac supply. Calculate (a) resonance frequency of the circuit (b) current flowing at resonance and (c) value of Q_0 by using different data.	6M	2	3

Q.4(A)	Derive the transient response for series RC circuit when switch S is closed at t=0 and excited by unit step signal.	10M	3	3

OR

Q.4(B)	Describe the Step response of a series RL circuit using Laplace transform.	10M	3	2

Q.5(A)	i) Derive the symmetry and reciprocity conditions for transmission parameters.	6M	4	2
	ii) Determine the hybrid parameters if Z_{11}=10 Ω, Z_{12}=Z_{21}= 15 Ω and Z_{22}= 18	4M	4	2

OR

Q.5(B)	Explain Z and Y parameters with necessary equation and draw its equivalent circuit.	10M	4	3

Q.6(A)	Design a constant k high pass and low pass filters given the cutoff freq = 2000 Hz and Z_0 = 600 Ω. Finally draw the filter π and T network.	10M	5	4

OR

Q.6(B)	Draw the circuits of Low pass, High pass, and Band pass filters. Also frequency response of all the three filters.	10M	5	4

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
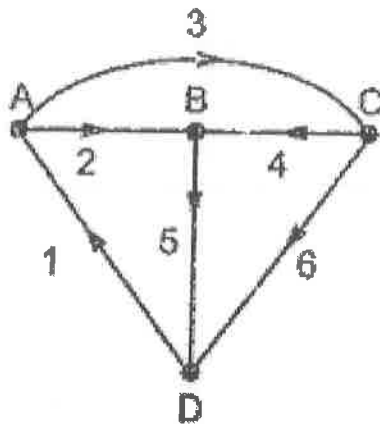## DIGITAL SYSTEM DESIGN
(ECE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	Perform the following conversions $(476.64)_{10} = ( )_2 = ( )_8$.	1M	1	3
	ii.	Define Binary coded decimal code.	1M	1	1
	iii.	Represent +45 and -45 in signed binary representation.	1M	2	1
	iv	Define SOP & POS.	1M	2	1
	v.	Give the differences between Latch and Flip-Flop.	1M	3	1
	vi	Write the characteristic table of SR Flip-Flop.	1M	3	1
	vii.	Sketch the CMOS circuit acting as an inverter.	1M	4	1
	viii.	Draw the basic configuration of PLA.	1M	4	1
	ix.	What is Entity in VHDL language?	1M	5	1
	x.	List the different types of modeling styles.	1M	5	1
Q.2(A)		Simplify and realize the following Boolean expression using logic gates. a) Y=AB+A'C+BC b) Y=(A+B'+C')(A+B'+C)	10M	1	3
		OR			
Q.2(B)		Perform the subtraction with the following unsigned binary numbers by taking the 2's complement of the subtrahend. i) 11010 – 10010 ii) 100 – 110000.	10M	1	3
Q.3(A)		Design a Full Adder circuit using gates and also Implement the Full Adder using 3x8 decoder and OR gates.	10M	2	6
		OR			
Q.3(B)		Implement a full adder circuit using (i) two 4X1 multiplexers (ii) one 3X8 Decoder and two OR gate.	10M	2	6
Q.4(A)		Explain how a T Flip-Flop is converted to J-K Flip-Flop.	10M	3	4
		OR			
Q.4(B)		Discuss the principle of Universal shift Register (USR). Using the same, design 4-bit, mod-8 twisted ring counter.	10M	3	2
Q.5(A)		What is programmable logic array (PLA)? Discuss the design of a combinational circuit using PLA with suitable example.	10M	4	2
		OR			
Q.5(B)		Explain CMOS logic family taking NAND gate as an example. Compare its fan-in, fan-out, noise margin, propagation delay with TTL logic family.	10M	4	4
Q.6(A)		Write HDL code for full subtractor with two half subtractor.	10M	5	3
		OR			
Q.6(B)		Explain Data flow modeling of combinational and sequential circuits. How it differs from Behavioral Modeling.	10M	5	4

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
PROBABILITY AND STATISTICS FOR COMPUTER SCIENCE
(Common to CSE, CST, CSE(IOT), CSE(DS), CSE(CS) & CSE(AI))

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	Define mutually exclusive events	1M	1	1
	ii.	What is the mean of X if its density function is $f(x) = 6x(1-x), 0 \leq x \leq 1$	1M	1	1
	iii.	If a random variable X follows a Poisson distribution such that $P(X=1) = P(X=2)$, find the mean of X	1M	2	1
	iv	Write the moment generating function of Normal distribution.	1M	2	1
	v.	What is the value of $E[X-\mu]$ =	1M	3	1
	vi	Write the range of correlation coefficient	1M	3	1
	vii.	What is the coefficient of Kurtosis β_2 =	1M	4	1
	viii.	If the two coefficients of regression are 0.4 and 0.9, then find the coefficient of correlation.	1M	4	1
	ix.	Define Null hypothesis	1M	5	1
	x.	If the Critical region is evenly distributed, then the test is referred as?	1M	5	1

		Marks	CO	BL
Q.2(A)	A company produces certain type of sophisticated item by three machines. The respective daily production figures are: Machine A, 3000 units; Machine B, 4500 units and Machine C, 2500 units. Past experience shows that the percentage of defectives in three machines are 1%, 4% and 2% respectively for the machines A, B and C. An item is drawn at random from the day's production and is found to be defective. What is the probability that it was produced from (i) Machine A (ii) Machine B	10M	1	3

OR

		Marks	CO	BL
Q.2(B)	A continuous random variable X has the probability density function, $f(x) = kxe^{-\lambda x}$ for $x \geq 0, \lambda > 0$ Where λ is a constant. Determine(i) λ value (ii) mean and (iii) Variance	10M	1	5

		Marks	CO	BL
Q.3(A)	Derive the moment generating function of Poisson distribution and find mean and variance.	10M	2	3

OR

		Marks	CO	BL
Q.3(B)	Assume that during seasons of normal rainfall the water level in feet at a particular lake follows normal distribution with mean 40 feet and standard deviation 5 feet. During such a season, find the probability that one can observe a water level (i) will exceeds 45 feet (ii) will be between 32 feet and 43 feet (iii) will be less than 48 feet (iv) will be less than 30 feet	10M	2	4

Q.4(A) Given the following bivariate probability distribution, obtain (i) Marginal   10M   3   4
distributions of X and Y (ii) V(X) and V(Y) (iii) Are X and Y independent?

X\Y	0	1	2	3
0	0.400	0.100	0.020	0.005
1	0.300	0.040	0.010	0.004
2	0.040	0.010	0.009	0.003
3	0.009	0.008	0.007	0.003
4	0.008	0.007	0.005	0.002
5	0.005	0.002	0.002	0.001

OR

Q.4(B)

i) Let X be a random variable with density $f_x(x) = \frac{1}{4} x e^{-\frac{x}{2}}$, $x \geq 0$ and let   5M   3   4

$y = -\frac{1}{2} x + 2$ Find the density for y.

ii) Assume that X and Y are independent uniformly distributed random   5M   3   4
variables over (0,2) and (0,3) respectively. If U= X-Y and V= X+Y, find the
density function of (U,V)

Q.5(A) Calculate the first four moments of the following distribution about the   10M   4   3
mean:

x	0	1	2	3	4	5	6	7	8
f	2	10	25	46	80	46	25	10	2

Also calculate β_1 and β_2.

OR

Q.5(B) Calculate the rank correlation coefficient for the following data: 10M   4   3

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

Q.6(A) Opponents of the construction of a dam on the New River claim that less   10M   5   4
than half the residents living along the river are in favour of the
construction. A survey is conducted to gain support for this point of view.
Of 500 people surveyed, 230 favour of the construction. Is this sufficient
evidence to justify the claim of the opponents of the dam? Use 0.05 level
of significance to test the claim. Also construct 95% confidence limits for
the true proportion of people for favour of the construction.

OR

Q.6(B) A random sample of 10 boys had the following I. Q's: 70, 120, 110, 101, 88,   10M   5   4
83, 95,98, 107,100. Do the data support the assumption of a population
mean I.Q of 100? Find a reasonable range in which most of the mean IQ
values of sample of 10 boys lie. Use 5% level of significance.

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022

DIGITAL DESIGN
(CST)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q. No.		Question	Marks	CO	BL
Q.1	i.	Convert $(63)_{10}$ to Excess-3 code.	1M	1	2
	ii.	Design OR gate using NAND gates.	1M	1	3
	iii.	Outline about don't care conditions with an example.	1M	2	1
	iv	What is K-map?	1M	2	1
	v.	Design 2x1 Mux using primitive gates.	1M	3	3
	vi	Recall the logic diagram for Half subtractor.	1M	3	1
	vii.	Distinguish between Combinational and Sequential Circuits.	1M	4	1
	viii.	Classify the various flip-flops.	1M	4	1
	ix.	Classify various PLDs.	1M	5	1
	x.	Distinguish between ROM and RAM.	1M	5	1
Q.2(A)		Illustrate the following	10M	1	3
		i) $(10110.0101)_2 = (?)_{10}$ ii) $(16.5)_{16} = (?)_{10}$ (iii) $(26.24)_8 = (?)_{10}$			
		OR			
Q.2(B)		Solve the following boolean functions.	10M	1	3
		i. $XY+X'Z+YZ$ ii. $X'Y'Z+X'YZ+XY'$ iii. $(X+Y)'(X'+Y')$ iv. $(BC'+A'D)(AB'+CD')$			
Q.3(A)		Design the following expression using tabulation method. $F(A,B,C,D,E) = \sum m(0,1,2,8,9,15,17,21,24,25,27,31)$	10M	2	3
		OR			
Q.3(B)		Illustrate the following expression using K-map and implement using basic gates. $F(w, x, y, z) = \sum m(0, 2, 4, 9, 12, 15) + d(1, 5, 7, 10)$.	10M	2	2
Q.4(A)		Explain about Half adder and Full adder with neat sketches.	10M	3	2
		OR			
Q.4(B)		Design 8x1 and 16x1Multiplexers using 4x1 Multiplexers.	10M	3	3
Q.5(A)		Explain the functionality of SISO & SIPO shift registers.	10M	4	2
		OR			
Q.5(B)		Design Asynchronous Decade counter using T flip-flops.	10M	4	3
Q.6(A)		Explain about PAL with an example.	10M	5	2
		OR			
Q.6(B)		Demonstrate the construction of ROM with relevant example.	10M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
DATA STRUCTURES & ALGORITHMS
(CST)

Time: 3Hrs   Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

			Marks	CO	BL
Q.1	i.	Define ADT. Give any two examples.	1M	1	1
	ii.	List out the advantage of linked list over array.	1M	1	1
	iii.	What causes underflow of stack? How it could be avoided?	1M	2	3
	iv	What are the limitations of linear queue?	1M	2	2
	v.	What is hashing?	1M	3	1
	vi	Identify the advantage of shell sort over insertion sort.	1M	3	1
	vii.	Define balance factor of AVL Tree.	1M	4	1
	viii.	Define a binary tree. Give an example.	1M	4	1
	ix.	State the principle of Topological sorting.	1M	5	1
	x.	Which data structures is used to implement DFS.	1M	5	2
Q.2(A)		What is Analysis of algorithm? Explain the Asymptotic Notations (Big O, Ω, θ) used while analyzing an algorithm.	10M	1	1

OR

Q.2(B)	Explain the following operations in a Circular linked list. With an example.	10M	2	2
	a) Insert an element at a specified position			
	b) Delete an element at a specified position		2	1

Q.3(A)	Give an algorithm to convert an infix expression to a postfix expression using stack with suitable example.	10M	2	2

OR

Q.3(B)	A circular queue has a size of 5 and has 3 elements 10, 20 and 40 where F=2 and R=4. After inserting 50 and 60, What is the value of F and R. Trying to insert 30 at this stage what happens? Delete 2 elements from the queue and insert 70, 80 & 90. Assess the sequence of steps with necessary diagrams with the value of F& R.	10M	2	4

Q.4(A)	Interpret an algorithm to sort a set of 'N' numbers using bubble sort and demonstrate the sorting steps for the following set of numbers: 30,52,29,87,63,27,19,54.	10M	3	2

OR

Q.4(B)	Given input {4371,1323,6173,4199,4344,9679,1989} and a hash function $h(x) = x \bmod 10$. Prepare the resulting for the following:		3	3
	i) Open hash table.	2M		
	ii)Open addressing hash table using linear probing.	2M		
	iii)Open addressing hah table using quadratic probing.	3M		
	iv) Open addressing hash table with second hash $h2(x)=7-(x \bmod 7)$	3M		

Q.5(A)	What is Binary Search Tree (BST)? Make a BST for the following sequence of numbers and Traverse the tree in all types of traversals. 9, 3, 5, 27, 4, 67, 18, 31, 13, 20, 39, 21, 45,32, 90	10M	4	3

Q.5(B)	Describe the different rotations defined for AVL tree. Insert the following elements step by step in sequence into an empty AVL tree 63,9,19,27,18,108,99,81.	10M	4	3

Q.6(A)	Describe in detail about the following representations of a graph.			
	i) Adjacency Matrix	5M	5	2
	ii) Adjacency List	5M	5	2

OR

Q.6(B)	Explain how Prim's algorithm is used for finding the minimum spanning tree of a graph. Find a minimum cost spanning tree of the following graph using Prims algorithm	10M	5	2
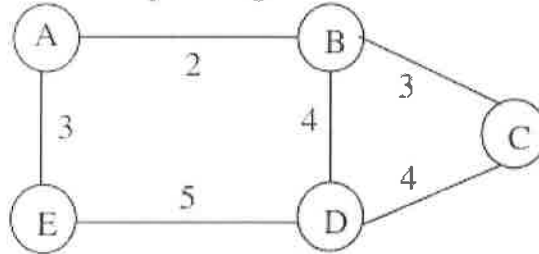
*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022

DATABASE SYSTEMS
(CST)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	What is a Database? Give an example.	1M	1	1
	ii.	What are the disadvantages in file system?	1M	1	1
	iii.	What is primary key?	1M	1	1
	iv	List aggregate functions supported by SQL?	1M	2	1
	v.	Define functional dependencies?	1M	3	1
	vi	What is Redundancy?	1M	3	1
	vii.	Draw the States of transactions.	1M	4	3
	viii.	Define durability?	1M	3	1
	ix.	Analyze the Limitation in SQL authorization.	1M	4	4
	x.	State the problems of Database Recovery.	1M	5	3
Q.2(A)		Design the relation model for the given the ER Diagram.	10M	5	6
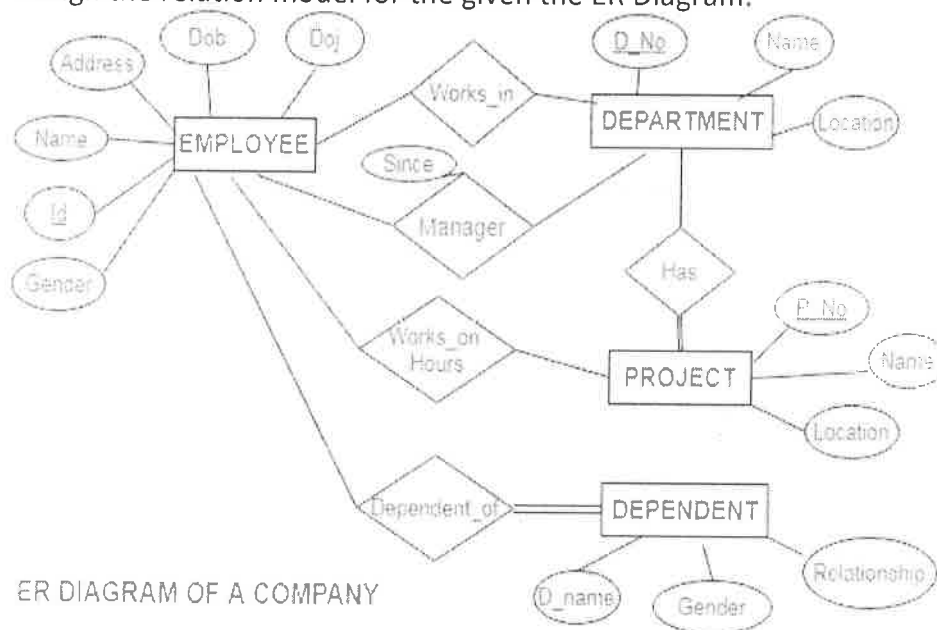
ER DIAGRAM OF A COMPANY

OR

Q.2(B)	Explain Database Architecture with neat diagram.	10M	1	2

Q.3(A)	Construct the SQL queries for the following: i. Retrieve all data from employee, jobs and deposit. ii. Give details of account no. and deposited rupees of customers having account opened between dates 01-01-06 and 25-07-06. iii. Display all jobs with minimum salary is greater than 4000. iv. Display name and salary of employee whose department no is 20. Give alias name to name of employee.	10M	2	3

OR

Q.3(B)	Illustrate the usage of key in designing database and explain its types.	10M	2	4
Q.4(A)	Discuss about the Normalization process in detail.	10M	2	2

OR

Q.4(B)	Explain briefly about relational algebra with suitable examples.	10M	2	2
Q.5(A)	State the ACID properties in detail with example.	10M	3	2

OR

Q.5(B)	Explain about hashing in detail.	10M	4	1
Q.6(A)	Discuss about the Mandatory access control in detail.	10M	4	2

OR

Q.6(B)	Explain about SQL injection techniques in detail?	10M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
DATA STRUCTURES
(CSE)

Time: 3Hrs   Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

Q.No		Question	Marks	CO	BL
Q.1	i.	Differentiate between time and space complexity.	1M	1	4
	ii.	How to allocate and de-allocate memory?	1M	1	2
	iii.	Write down the condition for Queue overflow.	1M	2	3
	iv	Can we implement queue using array?	1M	2	2
	v.	What is a skew tree?	1M	3	1
	vi	Define a Complete Binary Tree.	1M	3	1
	vii.	What is open addressing?	1M	4	1
	viii.	What is Divide-Conquer approach?	1M	4	1
	ix.	What are the properties of Red Black trees?	1M	5	1
	x.	Differentiate between tree and graph.	1M	5	4
Q.2(A)		Discuss in detail about asymptotic notations.	10M	1	2
		OR			
Q.2(B)		Write an algorithm to insert a new node at the end in the singly linked list with an example.	10M	1	5
Q.3(A)		How can we represent a circular queue? Explain with examples.	10M	2	2
		OR			
Q.3(B)		Convert the given infix notation to post fix: A +B * C / D – F + G ^ E.	10M	2	3
Q.4(A)		Discuss tree traversal techniques with examples.	10M	3	2
		OR			
Q.4(B)		Construct a BST for the following values and write an algorithm to traverse. 34, 67, 12, 89, 45, 43, 9, 34, 89, 32, 63, 83, 64, 49, 51	10M	3	3
Q.5(A)		Analyze the quick sort by taking one suitable example.	10M	4	4
		OR			
Q.5(B)		What is a collision in hashing? How it can be solved.	10M	4	3
Q.6(A)		Explain the graph traversal techniques with one suitable example.	10M	5	2
		OR			
Q.6(B)		Explain about rotations in a AVL tree and balance the AVL tree using rotations after insertion of 15.	10M	5	3

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
COMPUTER SYSTEM ARCHITECTURE
(Common to CSE, CS, DS, AI)
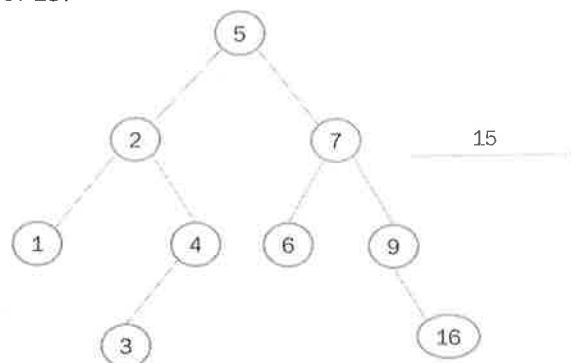
Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	State Demorgan's Law.	1M	1	1
	ii.	Find the equivalent Gray code for 1001100_2.	1M	1	1
	iii.	Represent $(-20)_{10}$ in two's complement format.	1M	2	2
	iv	Show the representation of IEEE 754 Single Precision Format.	1M	2	1
	v.	Draw the state diagram of an Instruction Cycle.	1M	3	1
	vi	Specify the roles of MAR and MBR.	1M	3	2
	vii.	List out the merits and demerits of clusters.	1M	4	1
	viii.	Mention the advantages of Hardwired Control Unit.	1M	4	2
	ix.	Distinguish between DRAM and SRAM.	1M	5	2
	x.	Differentiate between write back and write through protocols.	1M	5	2
Q.2(A)		Simplify the Boolean function F = $\sum$m (0, 2, 3, 4, 5, 6, 7) + d (8, 10, 11, 15) in Minimal SOP form using K-Map method. Also draw the logic circuit.	10M	1	4
		OR			
Q.2(B)		i) Design 8x3 encoder with the help of logic gates.	5M	1	6
		ii) Design a full adder with suitable logic gates.	5M		
Q.3(A)		Illustrate an algorithm for floating point addition/subtraction with a flow chart.	10M	2	3
		OR			
Q.3(B)		Illustrate the unsigned multiplication algorithm for the given data $(6)_{10}$ * $(6)_{10}$ with a neat flow chart.	10M	2	3
Q.4(A)		Explain the various addressing modes of ARM processor with suitable examples.	10M	3	2
		OR			
Q.4(B)		Describe in detail the addressing modes of x86 processor.	10M	3	2
Q.5(A)		Explain the working of Symmetrical Multiprocessors and Clusters with neat sketches.	10M	4	2
		OR			
Q.5(B)		Illustrate the working of six stage instruction pipeline. Also Briefly explain the various hazards in a pipeline.	10M	4	3
Q.6(A)		Explain the various levels of RAID with suitable sketches.	10M	5	2
		OR			
Q.6(B)		Let us consider a machine with byte addressable main memory of 64 KB and block size of 8 bytes. Assume a direct mapped cache memory consisting of 32 lines is used with this machine. i) Determine how this 16-bit memory address is divided into tag, line number and byte number. ii) Into what cache line would the bytes with each of the following addresses stored? 　i) 1111 1101 1101 1111 　ii) 1000 0010 1111 0000 　iii) 0001 0000 1001 1010	10M	5	5

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)

B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
OBJECT ORIENTED PROGRAMMING USING C++
(CSE/CSE-CS)

Max Marks: 60

Time: 3Hrs

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

Q.No		Question	Marks	CO	BL
Q.1	i.	What is Polymorphism?	1M	1	1
	ii.	List the operators that cannot be overloaded.	1M	1	1
	iii.	What is constructor? Different types of constructors.	1M	2	1
	iv	What is a destructor? Can the destructors be overloaded?	1M	2	1
	v.	What is dynamic binding?	1M	3	1
	vi	Different types of inheritance.	1M	3	2
	vii.	What are the file stream classes used for creating input and output files?	1M	4	1
	viii.	What is a file pointer?	1M	4	1
	ix.	Write the syntax for function template with multiple parameters.	1M	5	1
	x.	Keywords in Exception handling.	1M	5	1
Q.2(A)		Explain the structure of a C++ program with an example. Give the syntax of class definitions in it.	10M	1	2
		OR			
Q.2(B)		i) Explain the various data types used in C++.	10M	1	2
		ii) Explain in detail about any two features of OOP.			
Q.3(A)		i) With suitable example explain inline functions.	10M	2	3
		ii) Explain dynamic memory allocation and de allocation operators in C++			
		OR			
Q.3(B)		What is function overloading? Explain with an example program.	10M	2	3
Q.4(A)		What is inheritance? Explain multiple inheritance with an example program.	10M	3	3
		OR			
Q.4(B)		What is virtual function? Explain the virtual function call mechanism with an example.	10M	3	3
Q.5(A)		Identify the various classes available for file operations in C++.	10M	4	3
		OR			
Q.5(B)		Write a C++ program to copy the contents of one file to another file.	10M	4	4
Q.6(A)		Write a function template to swap the values in different data types.	10M	5	4
		OR			
Q.6(B)		Describe the exception handling mechanism in C++ with an example.	10M	5	3

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
DATABASE MANAGEMENT SYSTEMS
(CSE)

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	What is relation?	1M	1	
	ii.	List the different types of attribute.	1M	1	
	iii.	Differentiate between primary and foreign key	1M	2	
	iv	What is aggregation operation? Give example.	1M	2	
	v.	What is normalization?	1M	3	
	vi	State 1NF	1M	3	
	vii.	What is transaction?	1M	4	
	viii.	Define Serializability	1M	4	
	ix.	What do you mean by deferred update?	1M	5	
	x.	What is SQL injection attack?	1M	5	
Q.2(A)	Explain the 2-tier and 3-tier architecture of database.		10M	1	
	OR				
Q.2(B)	Draw an E-R diagram for a Life insurance company with almost all components and explain.		10M	1	
Q.3(A)	Discuss the different type of relational calculus operations with examples.		10M	2	
	OR				

Q.3(B) Flights(*flno*: integer, *from*: string, *to*: string, *distance*: integer, *departs*: time, *arrives*: time, *price*: real) 10M 2
Aircraft(*aid*: integer, *aname*: string, *cruisingrange*: integer)
Certified(*eid*: integer, *aid*: integer)
Employees(*eid*: integer, *ename*: string, *salary*: integer)
Note that the Employees relation describes pilots and other kinds of employees as well; every pilot is certified for some aircraft, and only pilots are certified to fly. Write a SQL query for the following
1. Find the names of aircraft such that all pilots certified to operate them have salaries more than $80,000.
2. For each pilot who is certified for more than three aircraft, find the *eid* and the maximum *cruisingrange* of the aircraft for which she or he is certified.
3. Find the names of pilots whose *salary* is less than the price of the cheapest route from Los Angeles to Honolulu.
4. For all aircraft with *cruisingrange* over 1000 miles, find the name of the aircraft and the average salary of all pilots certified for this aircraft.

| Q.4(A) | Explain the different type of normal forms with examples. | 10M | 3 |

OR

| Q.4(B) | Suppose you are given a relation R with four attributes $ABCD$. For each of the following sets of FDs, assuming those are the only dependencies that hold for R, do the following: (a) Identify the candidate key(s) for R. (b) Identify the best normal form that R satisfies (1NF, 2NF, 3NF, or BCNF). (c) If R is not in BCNF, decompose it into a set of BCNF relations that preserve the dependencies. | 10M | 3 |

1. $C \rightarrow D, C \rightarrow A, B \rightarrow C$
2. $B \rightarrow C, D \rightarrow A$
3. $ABC \rightarrow D, D \rightarrow A$
4. $A \rightarrow B, BC \rightarrow D, A \rightarrow C$
5. $AB \rightarrow C, AB \rightarrow D, C \rightarrow A, D \rightarrow B$

| Q.5(A) | Explain the 2 phase locking protocol. | 10M | 4 |

OR

| Q.5(B) | Explain the construction of B trees with example. | 10M | 4 |

| Q.6(A) | Discuss about various type of NOSQL data models. | 10M | 5 |

OR

| Q.6(B) | Discuss about immediate update based recovery techniques | 10M | 5 |

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – MARCH 2022
PROBABILITY AND STATISTICS FOR COMPUTER SCIENCE
(Common to CSE, CST, CSE(IOT), CSE(DS), CSE(CS) & CSE(AI))

Time: 3Hrs

Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	Define mutually exclusive events	1M	1	1
	ii.	What is the mean of X if its density function is $f(x) = 6x(1-x), 0 \le x \le 1$	1M	1	1
	iii.	If a random variable X follows a Poisson distribution such that $P(X=1) = P(X=2)$, find the mean of X	1M	2	1
	iv	Write the moment generating function of Normal distribution.	1M	2	1
	v.	What is the value of $E[X-\mu] =$	1M	3	1
	vi	Write the range of correlation coefficient	1M	3	1
	vii.	What is the coefficient of Kurtosis $\beta_2 =$	1M	4	1
	viii.	If the two coefficients of regression are 0.4 and 0.9, then find the coefficient of correlation.	1M	4	1
	ix.	Define Null hypothesis	1M	5	1
	x.	If the Critical region is evenly distributed, then the test is referred as?	1M	5	1

Q.2(A)	A company produces certain type of sophisticated item by three machines. The respective daily production figures are: Machine A, 3000 units; Machine B, 4500 units and Machine C, 2500 units. Past experience shows that the percentage of defectives in three machines are 1%, 4% and 2% respectively for the machines A, B and C. An item is drawn at random from the day's production and is found to be defective. What is the probability that it was produced from (i) Machine A (ii) Machine B		10M	1	3

OR

Q.2(B)	A continuous random variable X has the probability density function, $f(x) = kxe^{-\lambda x}$ for $x \ge 0, \lambda > 0$ Where λ is a constant. Determine(i) λ value (ii) mean and (iii) Variance		10M	1	5

Q.3(A)	Derive the moment generating function of Poisson distribution and find mean and variance.		10M	2	3

OR

Q.3(B)	Assume that during seasons of normal rainfall the water level in feet at a particular lake follows normal distribution with mean 40 feet and standard deviation 5 feet. During such a season, find the probability that one can observe a water level (i) will exceeds 45 feet (ii) will be between 32 feet and 43 feet (iii) will be less than 48 feet (iv) will be less than 30 feet		10M	2	4

Q.4(A)   Given the following bivariate probability distribution, obtain (i) Marginal   10M   3   4
distributions of X and Y (ii) V(X) and V(Y) (iii) Are X and Y independent?

X\Y	0	1	2	3
0	0.400	0.100	0.020	0.005
1	0.300	0.040	0.010	0.004
2	0.040	0.010	0.009	0.003
3	0.009	0.008	0.007	0.003
4	0.008	0.007	0.005	0.002
5	0.005	0.002	0.002	0.001

OR

Q.4(B)

i) Let X be a random variable with density $f_x(x) = \dfrac{1}{4} x e^{-\frac{x}{2}}$, $x \geq 0$ and let   5M   3   4

$y = -\dfrac{1}{2} x + 2$ Find the density for y.

ii) Assume that X and Y are independent uniformly distributed random   5M   3   4
variables over (0,2) and (0,3) respectively. If U= X-Y and V= X+Y, find the
density function of (U,V)

Q.5(A)   Calculate the first four moments of the following distribution about the   10M   4   3
mean:

x	0	1	2	3	4	5	6	7	8
f	2	10	25	46	80	46	25	10	2

Also calculate β_1 and β_2.

OR

Q.5(B)   Calculate the rank correlation coefficient for the following data: 10M   4   3

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

Q.6(A)   Opponents of the construction of a dam on the New River claim that less   10M   5   4
than half the residents living along the river are in favour of the
construction. A survey is conducted to gain support for this point of view.
Of 500 people surveyed, 230 favour of the construction. Is this sufficient
evidence to justify the claim of the opponents of the dam? Use 0.05 level
of significance to test the claim. Also construct 95% confidence limits for
the true proportion of people for favour of the construction.

OR

Q 6(B)   A random sample of 10 boys had the following I. Q's: 70, 120, 110, 101, 88,   10M   5   4
83, 95,98, 107,100. Do the data support the assumption of a population
mean I.Q of 100? Find a reasonable range in which most of the mean IQ
values of sample of 10 boys lie. Use 5% level of significance.

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
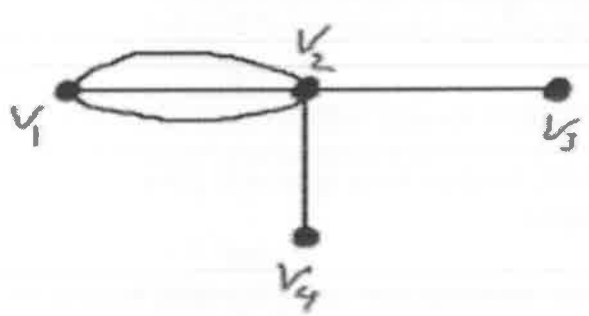**B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022**
DATA STRUCTURES & ALGORITHMS
(CSE-IOT)

Time: 3Hrs   Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

Q. No		Question	Marks	CO	BL
Q.1	i.	Classify data structures according to the organization of elements?	1M	1	2
	ii.	Assume that you have to store 20 items and you have to access the elements by their location. Which data structure among {arrays, linked lists, graphs, trees} is suitable?	1M	1	4
	iii.	Name any two applications of stacks?	1M	2	1
	iv	Show the contents of stack after the operations: push(10), push(20),push(30),pop(),push(40),pop(), and push(50).	1M	2	2
	v.	Construct postfix expression from the infix expression: (p + q) * (r + s)	1M	3	3
	vi	Construct a Min Heap from the elements {4, 10, 3, 5, 1}	1M	3	3
	vii.	What is the difference between static hashing and dynamic hashing?	1M	4	1
	viii.	Select the vertex with the highest degree and write its adjacent vertices	1M	4	4

	ix.	Based on what criteria, you can decide that a problem can be solved by Backtracking approach?	1M	5	2
	x.	Choose the correct option that gives an optimal solution to 4-Queens problem. a) (3,1,4,2) b) (2,3,1,4) c) (4,3,2,1) d) (4,2,3,1)	1M	5	3
Q.2(A)		Compare Linear and Linked Representations. List down the types of linked lists along with their applications?	10M	1	4

OR

Q.2(B)		Write an algorithm for finding the penultimate node in a singly linked list where the last element is indicated by a null ***next*** pointer?	10M	1	3

Q.3(A)	Explain the process of evaluating a post-fix expression (5 3 + 8 2 - *) using stack and write an algorithm.	10M	2	3

OR

Q.3(B)	Write an algorithm to print the given n elements in reverse order using a stack?	10M	2	2

Q.4(A)	An arithmetic expression can be represented by a tree whose leaf nodes represent variables or constants, and whose internal nodes represent operators such as +, - , *, and /. Consider the following binary tree and evaluate the arithmetic expression that the tree represents(Assume inorder traversal)	10M	3	5
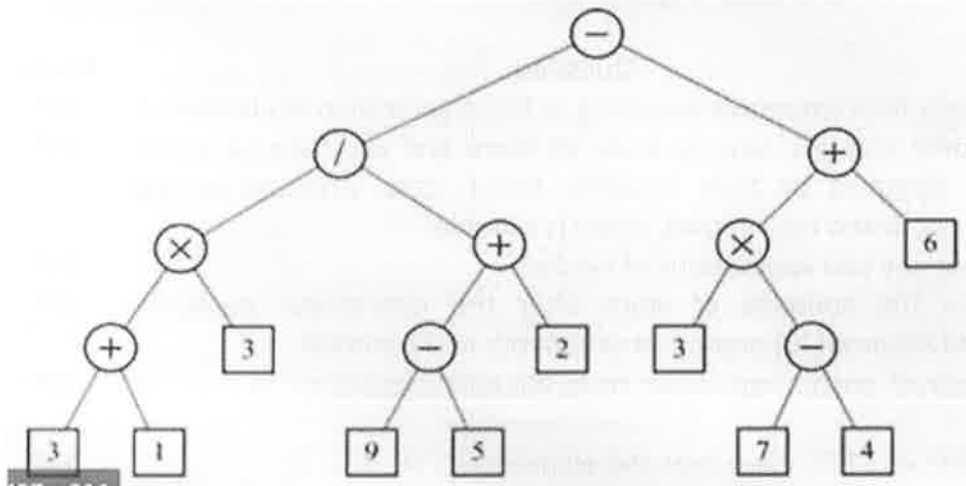
OR

Q.4(B)	Analyze the time complexities of insertion, deletion and search operations of a Binary Search Tree?	10M	3	4

Q.5(A)	List and explain various representations of Graphs?	10M	4	2

OR

Q.5(B)	What is collision? Explain various collision resolution techniques?	10M	4	2

Q.6(A)	Explain how Dynamic Programming approach solves Travelling Salesperson problem?	10M	5	2

OR

Q.6(B)	Explain Matrix Chain Multiplication using Dynamic Programming?	10M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
REAL TIME OPERATING SYSTEMS
(CSE-IOT)

Time: 3Hrs

Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

Q.No		Question	Marks	CO	BL
Q.1	i.	Differentiate between Hard real-time systems and soft real-time systems.	1M	1	2
	ii.	What is periodic task?	1M	1	1
	iii.	Write the Foreground/Background process?	1M	2	1
	iv	Define the schedulers?	1M	2	1
	v.	Write the six services to access the semaphore management?	1M	3	1
	vi	Define Least-Slack-Time-First (LST)?	1M	3	1
	vii.	What is the Clock Driven Approach?	1M	4	1
	viii.	Define the effective release time?	1M	4	1
	ix.	What is the Ceiling Protocol?	1M	5	1
	x.	Define PIP?	1M	5	1
Q.2(A)		i) What is Real-time systems? Give one practical example where Real-time system is used. ii) Write the performance measures for real-time systems.	10M	1	2
		OR			
Q.2(B)		Explain about Rate Monotonic (RM) Scheduling Algorithm with an example.	10M	1	3
Q.3(A)		Write -in detail about the Message mailbox and Message Queue.	10M	2	2
		OR			
Q.3(B)		Discuss about the Inter task communication and Interrupts.	10M	2	3
Q.4(A)		Explain about the Event Management and Message management.	10M	3	2
		OR			
Q.4(B)		Differentiate QNX and VX Works and PSOS.	10M	3	2
Q.5(A)		Discuss about the optimality of EDF and LST algorithms.	10M	4	3
		OR			
Q.5(B)		Briefly explain priority driven approach and weighted round robin approach.	10M	4	3
Q.6(A)		Explain in detail about the Effect of Resource Contention and Resource Access Control (RAC).	10M	5	2
		OR			
Q.6(B)		Write about the Priority-Inheritance and Priority-Ceiling Protocols.	10M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
OBJECT ORIENTED PROGRAMMING JAVA
(CSE-IOT/CSE-DS/CSE-AI)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	Write any three OOP principles.	1M	1	2
	ii.	What is Constructor overloading?	1M	1	1
	iii.	Write any three methods in String class.	1M	2	2
	iv	Define method overriding?	1M	2	1
	v.	What are different types of Exceptions?	1M	3	1
	vi	Write the methods used in Thread priority.	1M	3	2
	vii.	Write any three methods in Collection interface.	1M	4	2
	viii.	Differentiate between ArrayList and Vector?	1M	4	4
	ix.	Differentiate between swings and AWT.	1M	5	4
	x.	What is JFrame in Java?	1M	5	1
Q.2(A)	i) Write and explain Java Buzzwords.		5M	1	2
	ii) What is an Array and how declare and initialize different types of Arrays in Java		5M	1	1
	OR				
Q.2(B)	i) What is byte code in Java?		2M	1	3
	ii) Explain constructors with an example. Illustrate one scenario where constructors are used? How a constructor is different from other Methods in Java?		8M	1	4
Q.3(A)	Define inheritance. Write a java program to implement multi-level inheritance		10M	2	3
	OR				
Q.3(B)	i) Define package.		2M	2	1
	ii) "Interface variables are static and final by default in Java" - Support this statement with proper explanation		8M	2	4
Q.4(A)	List and explain the exception handling keywords. Write the benefits of Exception handling.		10M	3	2
	OR				
Q.4(B)	Write a java program to create a thread i) By extending Thread class ii) By implementing Runnable interface. Develop a program to illustrate how multithread operation is done?		10M	3	3
Q.5(A)	How do you write to a file in Java with suitable examples?		10M	4	3
	OR				
Q.5(B)	Demonstrate LinkedList and ArrayList with example programs.		10M	4	4
Q.6(A)	Discuss the various layout managers used in Java?		10M	5	2
	OR				
Q.6(B)	Design a simple calculator using Java swings.		10M	5	3

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
## ANALOG & DIGITAL ELECTRONICS
(CSE-IOT)

Time: 3Hrs
Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	Define drift current.	1M	1	1
	ii.	List the applications of tunnel diode.	1M	1	1
	iii.	Construct the symbol of N-channel depletion MOSFET.	1M	2	1
	iv	Define CMRR in op-amp.	1M	2	1
	v.	Write truth table for EX-OR gate.	1M	3	1
	vi	Define Fan-In.	1M	3	1
	vii.	Translate $(25B)_{16}$ to its octal equivalent.	1M	4	1
	viii.	Write Half-subtractor truth table.	1M	4	1
	ix.	Compare latch and flip-flop	1M	5	1
	x.	Classify Random Access Memory.	1M	5	1

Q.2(A)	(i)Explain V-I characteristics of Tunnel Diode.		5M	1	1
	(ii) Explain the input and output characteristics of CB – Bipolar Junction Transistor.		5M	1	2

OR

Q.2(B)	(i) Explain about clippers.		4 M	1	2
	(ii) Compute the values of Ic and Vce for the below voltage divider bias circuit for CE- Bipolar Junction Transistor .Given the current gain h_{fe} =β=50		6M	1	3
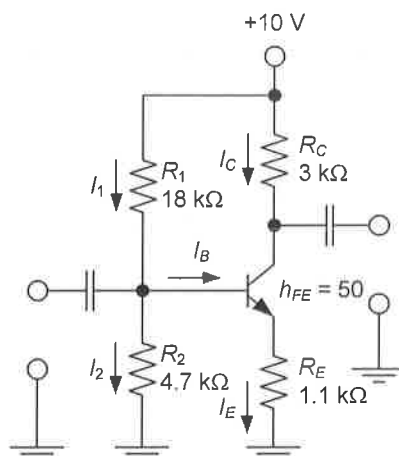
Q.3(A)	Explain the construction and operation of Junction Field Effect Transistor (JFET) and hence discuss its drain and Transfer characteristics. Also write relationship between drain current and Gate to source voltage.	10M	2	2

OR

Q.3(B)	i) Explain the Instrumentation Amplifier using three op amp.	5M	2	2
	ii) Explain the differentiator and integrator using op amp.	5M	2	2

Q.4(A)	i) Explain Schmitt trigger circuit with the help of diagram and obtain its transfer characteristics.	5M	3	2
	ii) Discuss Successive Approximation ADC.	5M	3	2

OR

Q.4(B)	Explain the following terms i). RTL ii). DTL iii). TTL iv). CMOS	10M	3	2
Q.5(A)	Interpret the logic function using NAND gates specified by function F = ∑m (0, 3,4, 7, 8, 10, 12, 14) + d(2, 6) using K-Map	10M	4	2

OR

Q.5(B)	For the following function F(W,X,Y,Z) = ∑m (1,2,3,5,13) + d(6,7,8,9,11,15) using K-map (a) Minimal SOP (b) Minimal POS.	10M	4	2
Q.6(A)	i) Design a four-bit binary ripple countdown counter.	5M	5	2
	ii) Discuss the Shift Registers.	5M	5	2

OR

Q.6(B)	Explain the operation and truth tables of JK and D type flip-flop.	10M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
DATA STRUCTURES USING PYTHON
(Common to CSE-DS/ CSE-AI/ CSE-CS)

Time: 3Hrs   Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

Q.No		Question	Marks	CO	BL
Q.1	i.	List out the different types of ADT.	1M	1	1
	ii.	Compare and contrast two and multidimensional array.	1M	1	2
	iii.	Why searching technique is important in Data structure?	1M	2	3
	iv	Compare Linear search and Binary search.	1M	2	2
	v.	What is singly linked list?	1M	3	1
	vi	What are the different characteristics of stack operation?	1M	3	2
	vii.	How circular linked list differ from doubly linked list.	1M	4	2
	viii.	What is the structure of doubly linked list?	1M	4	1
	ix.	Compare the characteristics of binary tree and binary search tree.	1M	5	4
	x.	How to calculate balance factor in AVL tree.	1M	5	1
Q.2(A)		Discuss the concept of array implementation and classify the different syntax of it with brief description.	10M	1	2
		OR			
Q.2(B)		Explain the concepts of List ADT and how it differs from Array give suitable examples.	10M	1	3
Q.3(A)		Discuss the concept of bubble sort and compare the working methods with selection sort.	10M	2	2
		OR			
Q.3(B)		Explain briefly about Binary search concepts and mention its merits and demerits with an example.	10M	2	4
Q.4(A)		Develop postfix expression from infix using stack.	10M	3	6
		OR			
Q.4(B)		Describe briefly about stack ADT and its different operations with syntax.	10M	3	3
Q.5(A)		Elaborate the concept of Multi Linked list and compare its properties and operations with Linked list.	10M	4	4
		OR			
Q.5(B)		Define Recursive function and mention its properties of recursion with one example program.	10M	4	2
Q.6(A)		Explain Quick sort for the following integers 10, 80, 30, 90, 40, 50, 70.	10M	5	2
		OR			
Q.6(B)		Describe the concept of AVL tree and also explain briefly about working nature and its different operations.	10M	5	2

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
COMPUTER SYSTEM ARCHITECTURE
(Common to CSE, CS, DS, AI)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	State Demorgan's Law.	1M	1	1
	ii.	Find the equivalent Gray code for 1001100_2	1M	1	1
	iii.	Represent $(-20)_{10}$ in two's complement format.	1M	2	2
	iv	Show the representation of IEEE 754 Single Precision Format.	1M	2	1
	v.	Draw the state diagram of an Instruction Cycle.	1M	3	1
	vi	Specify the roles of MAR and MBR.	1M	3	2
	vii.	List out the merits and demerits of clusters.	1M	4	1
	viii.	Mention the advantages of Hardwired Control Unit.	1M	4	2
	ix.	Distinguish between DRAM and SRAM.	1M	5	2
	x.	Differentiate between write back and write through protocols.	1M	5	2
Q.2(A)		Simplify the Boolean function F = $\sum$m (0, 2, 3, 4, 5, 6, 7) + d (8, 10, 11, 15) in Minimal SOP form using K-Map method. Also draw the logic circuit.	10M	1	4
		OR			
Q.2(B)		i) Design 8x3 encoder with the help of logic gates.	5M	1	6
		ii) Design a full adder with suitable logic gates.	5M		
Q.3(A)		Illustrate an algorithm for floating point addition/subtraction with a flow chart.	10M	2	3
		OR			
Q.3(B)		Illustrate the unsigned multiplication algorithm for the given data $(6)_{10} * (6)_{10}$ with a neat flow chart.	10M	2	3
Q.4(A)		Explain the various addressing modes of ARM processor with suitable examples.	10M	3	2
		OR			
Q.4(B)		Describe in detail the addressing modes of x86 processor.	10M	3	2
Q.5(A)		Explain the working of Symmetrical Multiprocessors and Clusters with neat sketches.	10M	4	2
		OR			
Q.5(B)		Illustrate the working of six stage instruction pipeline. Also Briefly explain the various hazards in a pipeline.	10M	4	3
Q.6(A)		Explain the various levels of RAID with suitable sketches.	10M	5	2
		OR			
Q.6(B)		Let us consider a machine with byte addressable main memory of 64 KB and block size of 8 bytes. Assume a direct mapped cache memory consisting of 32 lines is used with this machine. i) Determine how this 16-bit memory address is divided into tag, line number and byte number. ii) Into what cache line would the bytes with each of the following addresses stored? i) 1111 1101 1101 1111 ii) 1000 0010 1111 0000 iii) 0001 0000 1001 1010	10M	5	5

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B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
OBJECT ORIENTED PROGRAMMING JAVA
(CSE-IOT/CSE-DS/CSE-AI)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	Write any three OOP principles.	1M	1	2
	ii.	What is Constructor overloading?	1M	1	1
	iii.	Write any three methods in String class.	1M	2	2
	iv	Define method overriding?	1M	2	1
	v.	What are different types of Exceptions?	1M	3	1
	vi	Write the methods used in Thread priority.	1M	3	2
	vii.	Write any three methods in Collection interface.	1M	4	2
	viii.	Differentiate between ArrayList and Vector?	1M	4	4
	ix.	Differentiate between swings and AWT.	1M	5	4
	x.	What is JFrame in Java?	1M	5	1
Q.2(A)		i) Write and explain Java Buzzwords.	5M	1	2
		ii) What is an Array and how declare and initialize different types of Arrays in Java	5M	1	1
		OR			
Q.2(B)		i) What is byte code in Java?	2M	1	3
		ii) Explain constructors with an example. Illustrate one scenario where constructors are used? How a constructor is different from other Methods in Java?	8M	1	4
Q.3(A)		Define inheritance. Write a java program to implement multi-level inheritance	10M	2	3
		OR			
Q.3(B)		i) Define package.	2M	2	1
		ii) "Interface variables are static and final by default in Java" - Support this statement with proper explanation	8M	2	4
Q.4(A)		List and explain the exception handling keywords. Write the benefits of Exception handling.	10M	3	2
		OR			
Q.4(B)		Write a java program to create a thread i) By extending Thread class ii) By implementing Runnable interface. Develop a program to illustrate how multithread operation is done?	10M	3	3
Q.5(A)		How do you write to a file in Java with suitable examples?	10M	4	3
		OR			
Q.5(B)		Demonstrate LinkedList and ArrayList with example programs.	10M	4	4
Q.6(A)		Discuss the various layout managers used in Java?	10M	5	2
		OR			
Q.6(B)		Design a simple calculator using Java swings.	10M	5	3

*** END***

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B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
OBJECT ORIENTED PROGRAMMING USING C++
(CSE/CSE-CS)

Max Marks: 60

Time: 3Hrs

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

Q.No		Question	Marks	CO	BL
Q.1	i.	What is Polymorphism?	1M	1	1
	ii.	List the operators that cannot be overloaded.	1M	1	1
	iii.	What is constructor? Different types of constructors.	1M	2	1
	iv	What is a destructor? Can the destructors be overloaded?	1M	2	1
	v.	What is dynamic binding?	1M	3	1
	vi	Different types of inheritance.	1M	3	2
	vii.	What are the file stream classes used for creating input and output files?	1M	4	1
	viii.	What is a file pointer?	1M	4	1
	ix.	Write the syntax for function template with multiple parameters.	1M	5	1
	x.	Keywords in Exception handling.	1M	5	1
Q.2(A)		Explain the structure of a C++ program with an example. Give the syntax of class definitions in it.	10M	1	2
		OR			
Q.2(B)		i) Explain the various data types used in C++. ii) Explain in detail about any two features of OOP.	10M	1	2
Q.3(A)		i) With suitable example explain inline functions. ii) Explain dynamic memory allocation and de allocation operators in C++	10M	2	3
		OR			
Q.3(B)		What is function overloading? Explain with an example program.	10M	2	3
Q.4(A)		What is inheritance? Explain multiple inheritance with an example program.	10M	3	3
		OR			
Q.4(B)		What is virtual function? Explain the virtual function call mechanism with an example.	10M	3	3
Q.5(A)		Identify the various classes available for file operations in C++.	10M	4	3
		OR			
Q.5(B)		Write a C++ program to copy the contents of one file to another file.	10M	4	4
Q.6(A)		Write a function template to swap the values in different data types.	10M	5	4
		OR			
Q.6(B)		Describe the exception handling mechanism in C++ with an example.	10M	5	3

*** END***

MADANAPALLE INSTITUTE OF TECHNOLOGY & SCIENCE, MADANAPALLE
(UGC-AUTONOMOUS)
B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
DATABASE FUNDAMENTALS FOR SECURITY
(CSE-CS)

Time: 3Hrs   Max Marks: 60

Attempt all the questions. All parts of the question must be answered in one place only.
All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only

			Marks	CO	BL
Q.1	i.	What is Database?	1M	1	1
	ii.	Define DDL.	1M	1	1
	iii.	What is functional Dependancy?	1M	2	1
	iv	List out the storage strategiest	1M	2	1
	v.	Why recovery is needed in DBMS?	1M	3	1
	vi	Write a short note on the Condition for 2PL.	1M	3	1
	vii.	What is RBAC?	1M	4	1
	viii	What is the purpose of concurrency control?	1M	4	1
	ix.	What is database auditing?	1M	5	1
	x.	What is watermarking?	1M	5	1
Q.2(A)		Write SQL statements for following: Student(Enrno, name, courseId, emailId, cellno) Course(courseId, course_nm, duration) Add a column city in student table. Find out list of students who have enrolled in "computer" course. List name of all courses with their duration. List name of all students start with „a". List email Id and cell no of all mechanical engineering students.	10M	1	5
		OR			
Q.2(B)		Explain Operators in Relation algebra with examples.	10M	1	2
Q.3(A)		Discuss how multi level indexes are constructed using B trees?	10M	2	3
		OR			
Q.3(B)		Explain in detail about types of functional dependencies.	10M	2	2
Q.4(A)		Illustrate the process of various states of transaction with a neat state diagram.	10M	3	3
		OR			
Q.4(B)		Discuss in detail about Time Stamp - Based Concurrency Control protocol.	10M	3	2
Q.5(A)		Discuss in detail about Access Control methods with examples.	10M	4	
		OR			
Q.5(B)		Illustrate the importance of following terms in any database administration of Users, Privileges, Passwords, and Roles	10M	4	2
Q.6(A)		Explain in detail about Multilevel Secure Relational Model.	10M	5	2
		OR			
Q.6(B)		Explain in detail about Virtual Private Databases.	10M	5	3

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B.Tech II Year I Semester (R20) Regular End Semester Examinations – March 2022
FUNDAMENTALS OF ARTIFICIAL INTELLIGENCE
(CSE-DS/ CSE-AI)

Time: 3Hrs   Max Marks: 60

> Attempt all the questions. All parts of the question must be answered in one place only.
> **All parts of Q.no 1 are compulsory. In Q.no 2 to 6 answer either A or B only**

			Marks	CO	BL
Q.1	i.	What is Knowledge Base Systems?	1M	1	1
	ii.	What is rationality?	1M	1	1
	iii.	Define the bi-directed search.	1M	2	1
	iv	List out uninformed search strategies.	1M	2	1
	v.	Define alpha beta pruning.	1M	3	1
	vi	Define Hill climbing search.	1M	3	1
	vii.	Differentiate between forward and backward chaining.	1M	4	1
	viii	What is ontological commitment?	1M	4	1
	ix.	What is Fuzzy Logic.	1M	5	1
	x.	Define progression planning.	1M	5	1
Q.2(A)		Explain properties of environment in detail.	10M	1	2
		OR			
Q.2(B)		Explain in detail, the structure of different intelligent agents.	10M	1	2
Q.3(A)		Discuss any one uninformed search methods with example.	10M	2	2
		OR			
Q.3(B)		Differentiate sensor less problems with Contingency problems with suitable example	10M	2	3
Q.4(A)		Illustrate in detail about Informed search strategies.	10M	3	3
		OR			
Q.4(B)		Devise an AO* algorithm and explain how it is not suitable for searching in And-OR graphs	10M	3	5
Q.5(A)		Illustrate the use of first order logic to represent knowledge.	10M	4	3
		OR			
Q.5(B)		Explain Resolution by Refutation with suitable example.	10M	4	2
Q.6(A)		What are fuzzy membership functions? Explain them with examples.	10M	5	2
		OR			
Q.6(B)		Explain in detail about Bayesian network.	10M	5	2

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